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## TO OPEN The Shape Cossettator a opened by depressing the indentation on the direct of approximation a difficulty.

The Shape Cossectation is opinised by depressing the indentation on the driven of accordinately a 40° and. The drawer will then open out and up and deliver your celsates ring 11 Cassettes may be replaced in drawer facing either way. To close, sushif were slown and straight book in fig. 21

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### The Editor's Forum

Thanks to Tim Stoddard, I had the chance to "play" with a ZX81 the past two months. But, this was no ordinary ZX. Tim generously loaned me his "souped-up" ZX81 to demo at the TS Computer Fest. This computer contained the internal 64k RAM modification that is described in his issue; plus attached to the rear buss, was his proto-type D.A.M. board (Data Acquisition Module). If you remember (see Jan/Feb '87 and March/April '87 issues of TDM) the board contains an analog-to digital converter, a digital-to-analog converter, and a real time

## Special Information for TDM Subscribers

WHEN TO RENEW? To determine your expiration date, read the information in the upper-right corner of your shipping label (front cover). As an example: "May/87" means that the May/June 1987 issue will be your last one until you renew. If you forget, we will send you a reminder notice, but an early renewal is appreciated. You can use the form on page 38 if you like.

PRICE INCREASE IS COMING: We have held the price of an annual subscription at \$15/year for the past three years, while improving quality and increasing page count. Now our paper supplier has informed us of a 15% price hike, and the Postal Service will be raising their rates this coming April. Therefore, we are forced to increase our subscription rate to \$16.95 starting July 20th. (Our only competitor starting charging \$16.95 a few years ago, and their page count is much less than TDM's.) All subscriptions and renewals that we receive before July 20th, will be guaranteed the old rate of \$15/year. After that—\$16.95. Our promise to you: to continue publishing a good Timex/Sinclair magazine.

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clock. With the software that Tim had written, our demo could measure a room temperature reading from a small probe mounted at the top of the D.A.M. board, and display the reading on the screen. Also, a voltage in the range of 0 to 2.55 could be selected and typed in at the keyboard. The selected value would be printed on the screen and could be measured with a meter at two pins on the D.A.M. board. Not to mention that the real-time clock continuously displayed the date and time. All of this operated at the same time on just one little 'ol 2X81.

However, the most amazing thing was that Tim's computer didn't behave like the ZX81 I used to have. Let me explain. When Stephanie and I arrived at the Holiday Inn on Friday, the day before the show, we had a chance to set up early. I went ahead and put together the computer demo to make sure everything was going to work properly. Accidently, the ZX was left plugged—in overnite. The next morning (the day of the show) when I discovered it, the computer was just barely warm. It "fired up" up ok...no problems. During that day, the guests arrived and literally crammed into the exhibit room. With all of the computers and monitors (and warm bodies), the room temperature soared to 85°F (until some kind soul fixed the air conditioner). The ZX81 never once overheated or crashed it's program during the entire Fest! Something could be said of Tim's efficient internal 64k RAM design and the proper heat—sinking he used.

Along with the RAM upgrade article, we have news and photographs from the 1987 Midwest TS Computer Fest. Attending the Fest has made this issue come out a bit late. For this I apologize...but we should be back on track next issue. Also, a few of our features have been postponed until the next issue. For example Paul Bingham was to have the second installment of his CLASSY FROWT END series published in this issue. But I gave Paul some time off for a very good reason—he had a new addition to his family. A new son, Spencer Christian Bingham, was born on April 21st. Congratulations to a proud Dad and Mom. We'll see Paul back again next issue.

In closing, I might add that if there is something special you would like to see printed in an upcoming issue (perhaps an article or program for your computer in an area of special interest), just drop me a short note, and I'll see what I can do. Until then, "Happy Computing" and "don't give up on the chipi"

Sincerely, Tim Woods Managing Editor Time Designs Magazine Co.



FOR ALL TIMEX AND SINCLAIR COMPUTERS

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## LETTERS

#### TS2068 DISK DRIVE SYSTEMS

Dear Tim,

I have several questions/comments which may be of interest to other readers of TIME DESIGNS. I don't think I've seen any comprehensive article on the various disk systems that are available for the Timex Sinclair 2068. I have seen isolated advertisers's references and offerings on several of these, but I don't really know which way to jump to get the best deal of these for my purposes.

I have the Russell Speech Synthesizer for the ZX81. I've seen no reference on adaptation of this to the TS2068. I also have the TREE System FORTH ROM for the ZX81; I've seen no adaptation or anything similar for the TS2068.

I am still enjoying your magazine, as the best and now almost only source of Sinclair/Timex info and news.

Sincerely, Louis G. Dooley Ocala, FL

Editor: Good questions. I'll tackle them in neverse order. First, the best source of FORTH language in-formation for Sinclair computers in the U.S., is to contact Gary Ganger of the Dayton (Ohio) Microcomputer contact Gang Ganger of the Dayton (Ohio) Microcomputer Association. He is the founder of the FORTH Interest Group (FIG), a sub-group of DMA. Gary is very familiar with versions of the language for the ZX\$1/2068 and Spectrum, and is willing to help. You can contact him by writing to: \$12 Hedwick St., New Cartisle, Ohio, 45344. As for your second question, I'm sure it is possible, but haven't seen or heard of anyone adapting it to the T\$2068. Have you tried contacting Russell Electronics? Perhaps one of our headers have tone. Electronics? Perhaps one of our readers have some information. Finally, the topic of disk drives. Indeed we are guilty of not providing any major follow up to articles we have published in the past of available disk drive systems for the TS2068. I hope to correct that very soon. In the meantime, here's a quick overthat very soon. In the meantime, rere's a quica overview on what's out there. A total of five different systems have been released for the standard (non-spectrumized) 2068. Two of the systems are no longer available (Ramex Millenia K and Zebra's FDD-3000), which leaves the 2068 user with three to choose from. They are the Aerco FD-68 (Box 1893, Austin, Texas They are the Aerco FD-68 (Box 18093, Austin, Texas 78760), the Larkin Disk Interface (RRM2, Navan, Ont., Canada, K4B-1H9), and the Oliger Disk Drive Interface [1160] Whidbey Dr., Cumberland, IN 46229). It should be understood that the three models come as an interface circuit card and you must provide the drives/ case/power supply for the drives lierco does offer an optional disk drive package along with their inter-facel. Your best bet on drives would be to pick up a copy of COMPUTER SHOPPER, or consult your total TS dealer. (I know of one, RNG Enterprises, that stocks drives). It would be wise to write for information and prices on the three systems, in order to compare features, etc. Some of them offer "extras", such as an RGB monitor interface, or Spectrum compatibility, and NMI "magic button" SAVEs. If you have Spectrum emulated your 2068 and wouldn't mind a genuine Spectrum disk drive system, you might want to check out the new DISCIPLE Interface iRockfort Products, 8! Church Road, London, England, HWI 4DP) which sells for 139.95 in the U.K. Along with a disk interface, the Disciple also has a built-in Centronics printer interface, joy-stick ports, networking capabilities, and more. Quite an impressive unit that looks a lot like the Sinclair Interface One. I think we will be seeing more of this one in the months to come. Other Spectrum disk drive interfaces are available, such as the OPUS Discovery. You were right by stating you want a disk drive system that would sit your particular needs. That's the key to selection...and be sure to shop around, and (if possible) ask questions of other users who have such systems.

#### QL NEWS FROM THE U.K.

Dear Mr. Woods,

From this side of the pond a number of QL facts

have come to light:

1. Digital Precision is about to launch it's own desktop publishing package. 2. All those who paid in advance for a "FUTURA" mechine have had their money re-funded because, though advertised months ago, it appears not to have reached the circuit board stage. 3. The "THOR 20" complete with 68020 and an optional 68881 fp co-processor is at the circuit board stage and expected to be seen in mid-May (time will tell). Projected prices are £425 (without 68881) and £600 (with) for a 12.7 MHz version. 16.7 MHz versions will be twice this. 4. QRAM Utilities, the front end for the FUTURA (as was/is/maybe), appears to have been written not to work with programs compiled using the DP Supercharge and Turbo SuperBASIC compilers due to bad feelings between the companies. 5. A new adventure writing system with real-time simulation surfaced recently. 6. It is remoured that the QL's multi-tasking QDOS operating system is not actually owned by any-body, unlike SuperBASIC. Several companies are playing safe though, and are producing new compatible systems. Complete QDOS disassemblies are available from a number of companies including Sandy.

All the best with TDM.

Yours Sincerely,
Richard Howe
Proprietor
ARK DISTRIBUTION
Isle of Wight, United Kingdom

#### LOAD LOADER

BY WILLIAM C. ANDREWS

To dress up the sonitor acreen while loading a program I use the following short program. LINE 4 is the title to be displayed (up to 28 CHRs). LINE 9 in the actual program name ——limit 18 CHRs I7 with A & J after the 3). LINE 19 for a machine code III needed). LINE 11 is the loading title of this program. Edit LINE 11, delete the line number and REM and save onto tape or water before the main program.

1 BORDER 1: PAPER 1: CLS 2 LET L\*-" 3 LET K\*-"

4 LET N#="??"

3 PRINT AT 4, (31-(LEN N8+6))/ 2; PAPER 2; INK 0; BRIGHT 1; "F"; K6 ( TO LEN N8+4); "9"

6 PRINT AT 5; (31-(LEN N\$+6))/ 2; PAPER 2; INK #; BRIGHT 1; """ ; INK 7; \* ";N\$; " \*"; I NK #; " #"

7 PRINT AT 6, (31-(LEN N8+6))/ 2; PAPER 2; INK #; BRIGHT 1; "%"; L\* ( TO LEN N8+4); "d"

9 PRINT AT 15,11; PAPER 6; IN K 9; FLASH 1;" LDADING "; FLASH 6; PAPER 0; AT 15,9;" PLEASE WAIT

9 INK 1: LOAD "??" 18 LOAD "??"CODE 11 REM SAVE "??" LINE 1

#### LETTERS

#### MILLENNIA K

Where are the MILLENNIA K users? Surely most of you out there remember seeing an ad or two about a disk drive system for the TS2068 that bragged about the disk operating system that would allow 1,000,000 byte storage on a single disk. This letter is directed to the ones of you who had the nerve to fork out the \$450 or so required to obtain this reputably fabulous disk system from the now defunct RAMEX.

The brag turned out to be fact! The system turned out to be one of the easiest disk systems, to date, to use. It uses all the tape commands and the "extra" commands like FORMAT, CAT, ERASE, MOVE, etc. Not only that, it allows the use of "sequential files" which few Sinclair users have had the opportunity to use. However, you already know that because you bought one,

If you are reading this letter, the publishers of TIME DESIGNS have seen fit to open the new arena of SPDOS information. The desire is to provide support to some new orphans in the form of exploration of the interface and the supporting SPDOS. If there are any questions about methods of implementing programs using gestions about methods of implementing programs using sequential files or expanding the command list, or getting programs to work with the system, just write in and I'll do my best to answer the query or find the answer from some of you.

> Please Write To: Munson H. Cockayne, Jr 342 Trotter Court Sanford, Plorida 32771

#### QL USERS PLEAT "TO BE OR NOT TO BE?"

HACKERS ALERT. The Bard hit the QL nail right the head when he asked, "to be or not to be, that is the question". Fairly put, the question—is the QL a capable User "can do" computer, or are we "hacking" it to death?

If the QL is such a good programer/hacker's machine, then how come there aren't any "made in the USA" programs? We need American programs designed for the American non-programmer User's usel This includes a "load and useable" database program, comprehensive accounting and bookkeeping programs for business, nonprofit church and home use, and a lot more. The only difference between a programer/hacker and the non-programer User, is that the hacker is a "self sufficient" user.

If, the knowledgeable backers would stop their "self sufficiency" long enough to write some of these needed programs, it would re-vitalize the QL's perception. By so doing, they could give our QL the "Dual Life Expectancy" that it deserves. So backers, ask not what the QL can do for YOU, rather what YOU can do for the QLI If YOU don't, who will? Do it before it is too

#### Kenton Garrett Lansing, KS

Editor: Your points are well taken. But let me naise an issue which you may not have thought of. The actual numbers of QL's currently in use here in the U.S. (not to mention the number of bonafide hacker/programer's) is very low. I have heard that estimates range between 2 to 5 thousand units. That factor may have something to do with the lack of user-oriented "serious" software. Vet in many European countries (i.e., France, Germany, etc.), ten times more QL's were sold...and explains why they are neleasing a substantial amount explains why they are releasing a substantial amount of both hardware and software support. Perhaps your letter will strike some chords and stir some interest. I couldn't agree with you more about the need for programs that are geared to the user nather than the engineer-types, or require one to digest documentation that suspiciously looks like it was written in latin.

#### HURRAH FOR NOVELSOFT

Recently I purchased TIMACHINE from Novelsoft. Try as I might, the program wouldn't LOAD; it was the first tape I have ever been unable to LOAD or SAVE immediately. I wrote Novelsoft detailing the steps I had taken, along with some print-outs of various segments I was able to access, asking for their help in resolving the problem.

Shortly after, I received from David Ridge, what he believed to be the answer to the problem, along with a request that should I have any further difficulty, to contact him for further assistance. Every-

thing worked fine.

I thought it would be nice, were you to include some mention of this in your column. It is very reassuring that TS users can deal with people as responsible as Novelsoft, even in a market as limited as the Timex Sinclair.

> Yours truly, Francis C. Dupre Southampton, Pa

#### APRIL FOOLER

Well, I guess it's time to renew my subscription and it's my pleasure, I look forward to each issue of TDM and I thank you for keeping the faith in the TS computer systems.

I was going to write about the modem program in your last issue, about how I interfaced the simple modem to my 2068 and how I ran the program and about how I connected with dozens of mail boxes. I won't do that but I hope next year somebody comes up with a fantastic APRIL FOOLS gag for the author of that article.

> Warren Tucker Valleto, CA

#### NEW CAR SHOPPER

Dear Tim,

Here is a little program I wrote to compare car prices and figure approximate loan payments. It tells me I can't afford to buy the cars I already own!

> Paul Hill SINCUS NEWS Johnson City, NY

Johnson City, NY

5 REM data from CONSUMER REPO
RT Magazine
10 INPUT "Car Name ";ns;" Mode
10 INPUT "Car Name ";ns;" Mode
120 PRINT "S: PRINT ms: INPUT "
5ticker Price ";s: INPUT "
5ticker Price ";s: LET c=c,"
130 PRINT "Sticker Price \$";s:
1NPUT "Cost Factor ";c: LET c=c,"
130: LET Desleces
40 PRINT "Destination Costs ";
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40 PRINT "Puss Shipping Costs
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67 PRINT "Approx. Buying Price
68 PRINT "Approx. Buying Price
69 PRINT "Approx. Buying Price
60 PRINT "Approx. Buy se program will not work property

130 LET ri=.19: LET r2=.205: LE

r3=.215: REM approx a 9% rate,
adjust r values as necessary,
140 LET toan1=(loan+(ri+toan))
26: PRINT "3 Year Loan Payment =
\*\*(toan1
150 LET toan2=(toan+(r2+toan))/
45: PRINT "4 Year Loan Payment =
\*\*(toan2
150 LET toan3=(toan+(r3+toan))/
50: PRINT "5 Year Loan Payment =
\*\*(toan3
170 REM add printouts to carry
around with you as you shop!

## For Your Sinclair

### New Releases

Last issue we reported on an external keyboard interface that uses the cartridge port of the TS2068, available from John Mathewson (1852 Appleford St., Gloucester, Ontario, Canada KlJ 6T4). John has been busy designing new peripherals for the TS2068, and now has several other new items. The "Sound Booster" plugs into the rear port and amplifies both the BEEP and SOUND information sufficient to drive an 8 ohm, 8" speaker, or there is a low level output provided to drive another power amp or stereo amp. The on-board 9 volt battery helps to reserve the computer's internal power for other devices. A feed-thru buss is also included. The "Sound Booster" board is priced at \$41.50 U.S. funds (battery and speaker are not included). An RGB interface is now available for \$34.95 U.S. funds, and provides an output to drive any RGB-type color monitors. Press-on type Key Caps for external keyboards are available for \$5 a set. A "Cartridge Adapter" card has also been designed to plug any cartridge into the rear buss of the TS2068 whenever the cartridge dock is occupied. Write for further information.

A new machine code utility software package is available for the ZX81/TS1000/TS1500 called KAPKIT 1000. A number of special routines are included that will save the ZX/TS programmer time and allow greater flexibility. Move whole programs or variables to high or low RAM and back, convert hex to decimal, delete more than one program line at a time, and much more. A cassette tape and complete documentation are available from: LST Software, Box 62, Alcester, SD 57001, for \$14.95 plus \$1.95 for \$84. The program is also available from E.Arthur Brown.

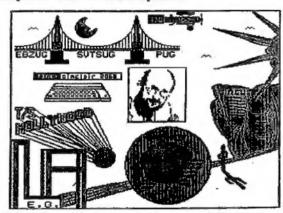
You may have noticed that Commodore's inexpensive 1520 Printer/Plotter has dropped in price. One of our long time readers (and occaisonal contributor), John McMichael, has devised an interface and companion software driver to operate the 1520 with a Timex Sinclair 2068. The result is high-resolution four color graphic plotting with the Timex, using simple LPRINT commands. For complete details and prices, send a legal SASE to: John McMichael, 1710 Palmer Dr., Laramie, WY 82070. He will even provide you with an address where you can buy the plotter for \$49.95.

PC-DRAW is a software package just released by a promising new company called MDM Enterprises. The impressive new program allows the user to design detailed printed circuit board artwork, which can then be printed and photographed, providing a negative for circuit board etching. Circuit drawing is made easy with joystick control, and the user-friendly documentation takes you through the procedures step by step. PC-DRAW supports all of the popular TS printer interfaces and is set up for Bpson compatible printers. Similar programs for other computers are expensive. This one sells for \$19.95 plus \$3.00 (total order) S&H and is exclusively available from: Knighted Computers, 707 Highland St., Fulton, NY 13069, tel. (315) 593-8219.

CompuServe Information Service has introduced a new graphics medium, that will eventually replace the RLE graphics (for information on this subject, reference Stan Lemke's article on RLE in the Jan/Feb '87 issue of TDM). The new standard is called GIF (for Graphics Interchange Format). With the appropriate software, a picture file could be "downloaded" via a modem from CompuServe, then displayed on the screen or sent to a printer. GIF allows for full color and high resolution on many types of personal computers. Larry Wood of the Picture Forum (GO PICS) on CompuServe, recently told TDM

that information would be released to Sinclair programmers to see if a GIF decoder or encoder program is feasible with our computers.

Speaking of telecommunications, the second edition of "The Guide To T/S Telecommunications" by Pete Fischer and Steve Ishii is out...and is it ever a real gem! The new deluxe and expanded edition hardly resembles it's forerunner. The guide was re-printed using a laser printer and is much more readable. The front cover is actually an RLE graphic that was passed around to a number of TS users who added their own design, resulting in an interesting collage of pictures from around the U.S. Well worth the \$5 price. Get your copy from: Pete Fischer, P.O. Box 2002, Tempe, AZ 85281. Pete showed his second edition guide for the first time, at the Midwest TS Computer Fest in Indianapolis.



This RLE graphic was specially produced for the cover of the new deluxe edition of "The Guide To T/S Telecommunications". Several TS users from around the U.S. took part in drawing the graphics that make up the picture.

Having trouble figuring out the new tax laws that were recently passed by our U.S Congress? A special 2068 program just might be your ticket. Herb Bowers, a former Federal Auditor and private tax preparer has put together a comprehensive tax software package that contains two separate programs. "THE NEW TAX LAW AND YOU" is priced at \$12.00 postage paid, and is available from the author: Herb Bowers, Sr., 2588 Woodshire Circle, Chesapeake, VA 23323, tel. (804) 487-5924. Be a tax "expert" and impress your friends with the astonishing accuracy that your TS2068 can calculate the new tax code.

Charles Stelding has a TS2068 desktop publishing software package, and now has released a version just for Olivetti 2300 Ink-Jet printer owners (The WJDJUP Company's "Winkjet 1" printing utility is required). For a sample print-out and demonstration of what the program can do, send a legal SASE to obtain information and prices to: Charles Stelding, 1415 South Baxter, Tyler, TX 75701.

Have you wanted to really put ARCHIVE to work (the database program that comes "free" with a QL), without a lot of programming headaches? You may want to check out the ARCHIVIST and MAILMERGE software packages from Ark Distribution, Corve Parmhouse, Chale Green, Ventnor, Isle of Wight, U.K., PO38 2LA. Write for information and pricing or contact your local QL dealer for a demonstration.

### MIDWEST TS COMPUTER FEST

#### A Huge Success - AGAIN!

by Joe Williamson

May 2nd and 3rd was the peak time of the year for Timex and sinclair enthusiasts who once again converged for a weekend of fun and info gathering on our beloved computers. This year Indianapolis, Indiana was the site for the 2nd Hidwest Times Sinclair Computer Fest. If you were not there, you missed the best one yet!

More than 45 dealers and user groups displayed their wares in over 6000 square feet of space. There were two separate seminar rooms with scheduled seminars running all day in both rooms. There was also a "swap shop" room were TS users exchanged and sold their unused equipment. A banquet was held on Friday night before the Fest to get all the dealers and user groups aquainted which was enjoyed by all.

More than 700 people were in attendance with family members either enjoying the show or the excellent hospitalities of the Holiday Inn or even Indianapolis itself including the Speedway which was having time trials that weekend. All in all, this show was more than twice the size of last year's show. As last year, people from all over the US were there as well as from Canada, England, Mexico, and El Salvador.

The entire line of Timex & Sinclair computers were represented as well as some clones such as the Thor (a QL clone) and the PC 8300 (a TS 1000 clone). Many semisupporters were also there including representatives from CTM magazine, Computer Shopper, compuserve, PC Pursuit, and The White Church Cabin who sold buttons commemorating the Computer Fest.

There was a shift of exphasis this year to the QL which seems to be doing such better than alot had expected last year, Sharp's, Brice Road Pharmacy, Variety Sales, C. W. Associates, Curry Computer, Quantum Computing, Markel Electronics, RMG Enterprises, Time Designs, Sync Ware News and Quantum Levels all had excellent products available for the QL at the show. A+ Computer Response was also there showing their support for the QL.

The 2068 was not lacking in support either. Several new products were demonstrated and sold. RT Mnewonics. Variety Sales, The Widjup Co., Poote Software, Byte Power, JRC Software, WMJ Data Systems, Grey & Clifford. Computers, RMG Enterprises, Novelsoft, Aerco, Zebra Systems, Knighted Computers, Semper Software, EZ Key, E. Arthur Brown, The John Oliger Co., Lenke Software Development, Larkin, Time Designs, and Synoware News all had products or catalogs available. Most of the seminars covered the 2068 and it seems that this year the trend is toward telecommunicating with the 2068 instead of just playing games. Also, desktop publishing on both the 2068 and QL seems to be popular this year.

The 2X81/TS1000/1500 had its own following with such companies as WMJ Data Systems, Sirius Ware, Zebra Systems, Silicon Mountain Computers, The John Oliger Co., Semper Software, EZ KEY Thomas B. Woods, Synoware News, and Time Designs represented at the show.

The User groups were also well represented and are becoming a key to the continued support of Indiana STUG, Greater computers. The Cleveland SUG, Chicaga Area TUG, Sinclair Milwaukee UG (SMUG), Capital Area TSUG (CATS), North East Florida TSUG, Sinclair Louisville UG (SLUG), Tampa and ST. Pete Area Members TSUG (TASBAM), The San Diego UG, SAF UG, and the Guanta QL users group from England. User group representatives from all over the country were there to share and gather Information.

There were many door prizes donated which made it possible to have about eight prizes given away each hour! Some of the door prizes given away were the software packages, service manuals, subscriptions, gift certificates, books, and newsletters. Everyone certificates, books, and newsletters. Everyone I spoke with said that they enjoyed the show and will return again next time. Next time is already on the drawing board and will be a reality. Also In the works is a show to be held next March in the Orlando Plorida area. producers of the Midwest TS Computerfest will help The the North East Florida TSUG and the TASBAH group put on the Sarch '88 show which has already received tremendous support from the dealers present at the last show.

This is an excellent opportunity for everyone to come down and bring their family for a nice vacation in Florida. The site for the show will be very close to Disney World, Sea World, Circus World, and other major attractions. Also, this is off season time and vacation packages will be available at reasonable rates.

For more information, contact Eric Johnson, 249 N. Harden Ave, Orange City, FL 32763. A BBS will be set up at his address to gain more information soon. Actual date of show will be announced soon. Start making plans

The show was very well organized and proper credit should be given to all those envolved. The Show was put on by a non-profit enterprise comprised of various user groups and individuals in the Midwest. Frank Davis is the producer and TS Founder. He and the following people should be applauded for putting on an excellent show.

Paul Holagren Willie Jones Ralph McCrum Carol Davis Rhonda Jones

Executive Chairman User grp. Coordntr/Registration Chairman Swap Heet Chairman/ Door Prize Coordntr. Basil Wentworth Seminar Chairsan Computer Fest Consultant/Treasurer Special Assistance Program Booklet Coordinator

1987 Computer Fest Committee Members:

Jack Payne Tom Burt Hilda Burt Bill Bell Hike Felersk Frank Duncan

Tim Woods

Also, special thanks should be given to the Holiday Inn North of Indianapolis and many others who made the 1987 Midwest TS Computer Fest possible. I hope I covered everyone that was there!



Stewart Newfeld of Zebra Systems

## WHO was there? WHAT was there? Another look at the 1987 Sinclair Extravaganza...

Reported by Tim Woods

Most "sophisticated" computer people who can even remember the Timex Sinclair, would like to think that it dried up and withered away. But remember the old saying "you can't keep a good man down"? Certainly holds true with the Timex Sinclair community. Participation of both dealers and users at the 1987 Midwest TS Computer Fest held on May 2nd and 3rd in Indianapolis, Indiana, reaffirmed and demonstrated that there still is tremendous interest in Sir Clive's computers.

Something must be said of this phenomena of getting behind an "orphan" computer and supporting it long after the manufacturer has severed ties and even forgotten it exists. (Evidence of this is seen elsewhere; some 10,000 die-hard TI994/A fans recently held a computer fair in Chicago. One enterprising individual is manufacturing TI clones. There is even a large support group for the Adam and another one for the IBM PCjr.) It is like a silent revolution, where the consumer takes action into his or her own hands. In a conversation with one long-time TS supporter at the Fest, he told me, "I have grown to be comfortable with my Timex system and it's kind of a challenge to find where I can still get programs and hardware for it. Sure there are faster, more powerful machines, but I am very happy with what I have. Why should I go out and plunk down some bucks for an IBM clone or an Atari ST, when I haven't even explored all of the potential of my own machine? And I'm having a lot of fun too!"

Several new items were displayed or announced for the first time ever at the TS Computer Fest. Many of the exhibiting dealers had large booths with monitors set up to demonstrate their wares.

Mark Steuber from Sharp's Inc., of Mechanicsville, Virginia (who also happens to be the author of WAR IN THE EAST, a program that has sold quite well in the U.K. recently), had several new offerings for the QL, along with some news of other developments. Most important perhaps is that a new board called the TRUMP CARD, will available by the time you read this, for \$299.95. And get this-along with a full-featured disk interface you also get additional RAM that will boost your QL's memory to 900K!! At the Sharp's table were some hardware upgrades from Miracle Systems and Sandy (including the SUPERQBOARD and SUPERMOUSE). A new keyboard replacement for the QL called the Schon Keyboard was also shown. Reportedly it only takes about three minutes to install, and is priced at about \$90. It had the feel of a very good typewriter keyboard. Mark said that several of his customers are interested in the new CP/M operating system from Ultrasoft, and that he has it on order. This should open a vast amount of public domain software for the QL.

On another note, it was announced that Sharp's Inc. had bought out Knighted Computer's QL business. Knighted Computers (of Fulton, New York) will no longer stock QL products, but instead will be concentrating on the other computer lines like the Amstrad, but will also continue to support the Timex Sinclair 2068. Ray Payne, co-owner of Knighted mentioned that the QL business had been an "up and down" affair, yet the TS2068 has proven to be a very steady enterprise. They have a whole list of superb programs for the Timex that have been converted from the Sinclair Spectrum, including their latest, TOMAHANK, a helicopter flight/air battle simulation.

Continued Next Page ...



Jon Roketenetz (programmer) and Mark Fendrick of Markel Enterprises have just released "ElectriQL Desk".



The CST THOR, a QL clone is shown by Curry Computer.



Joe Williamson at the Foote Software booth.



TDM's Editor, Tim Woods chats with Mowgli Assor, the programmer of "SEKTOR 2068", a disk utility.



At the Sharp's Inc. booth: the Schon Keyboard and disk interface/RAM board from Miracle Systems.

#### MIDWEST TS COMPUTER FEST

Zebra Systems of Woodhaven, New York, again (as in Cincinnati last year) had the largest display of Timex Sinclair merchandise. Everything from books, Memotech interfaces, programs, and even a new Wico Trackball controller for the Sinclair QL. For months, rumors had been circulating in the Sinclair community that Zebra was "getting out" of the Timex business. But the truth is, while they do have on-going development for other lines (like the Tandy and Atari), they have committed to continue support for the Timex. They have a large inventory of related merchandise including a number of used ZX81s, ZX power supplies, and un-tested 2050 modem cards.

Stewart Newfeld, manager of Zebra Systems even reported that an all new catalog would be printed shortly. I think that most Pest attendees were impressed with Zebra's attitude and confirmation of support for TS users, which greatly differs from some of the rumors that were floating around recently.

It was a real joy to see that Curry Computer could make it to this year's Fest (all the way from Phoenix, Arizona). They brought with them a good sampling of their Sinclair product lines, which leans heavily towards the Sinclair QL. On display was both a Sinclair Spectrum 128 (pre-Amstrad) and the CST THOR (the newest



TS Fest Committee members and helpful personages: (back row, L to R) Gary Ganger, Tom Burt, Hilds Burt, Paul Holmgren, Willie Jones, Basil Wentworth, Bill Bell, and Frank Duncan. (Front row, L to R) Frank Davis, Carol Davis, Jack Roberts, and Rhonds Jones. A map depicted areas where Fest attendees came from.



The Priday night Banquet was attended by the exhibitors and Pest committee members. It was held in the hotel's spacious ballroom, complete with crystal chandeliers. This was the perfect "kick-off" to the successful 1987 Hidwest TS Computer Pest.



The food at Friday night's Banquet was superb! Salads, croissants, tenderloin tips, chicken, and world famous strawberry cheesecake were the featured fare...and the service wasn't bad either.



Editor Tim Woods and Assistant Manager Stephanie Woods of TIME DESIGNS, enjoy excellent dinner conversation with Ian Robertson (far left) from Toronto, Canada and several other TS notables.



Tom Bent answers a customers question. Tom is the editor of QUANTUM LEVELS and is the U.S. librarian for QUANTA, the London-based QL users group.



Representatives of CATS, the Washington, D.C. area TS users group, (L to R) Hank Dickson, Audrey and Bob Curnutt, and Ruth Pegley.

QL clone from the U.K.). They also had a video showing highlights from their recent trip to a Personal Computer Show in England. Rob Curry demonstrated how the Psion Organizer works. It's a hand-held pocket computer, that can download and upload QL data via a serial cable. This is one powerful little device to watch, as versions are available for IBM compatibles and is even reported to be adaptable to Lotus 1-2-3.

# adaptable to Lotus 1-2-3.

Chris Raynak mans the Creater Cleveland Sinclair Users Group booth. The group had an impressive display of graphics.



Mark Steuber of Sharp's Inc., explains how the latest QL hardware and software innovations operate,

#### MIDWEST TS COMPUTER FEST

Mark Fendrick was back again this year representing Markel Enterprises, and had teamed up with Peech II Productions (Jon Rokentenetz) to produce a new QL program called ELECTRIQL DESK. It has an icon-driven menu and is similar to "sidekick" programs that contain several useful functions in one software package. ELECTRIQL DESK is priced at \$24.95.

Continued On Page 10



It's the Amstrad PC1512, an IBM clone, displayed here by a local Amstrad rep. Complete systems start at \$800.



Ariel Prailich, programmer for Novelsoft of Toronto, Canada, dona his "expert" cap to promote their new program ZXPERT.



Staff of Quantum Computing on hand to answer questions: Monica Merel (General Manager) and Colin I. Cooke of London, England (Director of International Operations).



Smiling Debby Curry, co-owner of Curry Computer, reported that Spectrum software sold very well at the Fest.





Left: "One of a kind"—e transparent TS2068 with a footePrint Interface in the cartridge dock. Oenter: Dick Cultice, a member of SMUG from Nisconsin, at the helm of his TS2068 system including a full-blown Aerco PD-68 floppy set up. Right: At the RMG Enterprises booth, Rod Gowen demonstrates the new Larken TS2068 disk system.



#### MIDWEST TS COMPUTER FEST

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Joe Williamon of lotte "thate from Gamesta" Flot and has the little wet in the relative the eround for the Limit. The FootePrint in a manufacture that fits in the cartridge dock, and is constible with print drivet software for the Aurin in it and Terman P and T. The \$45 price love to be and the form Citie, and software or carsetta, i ere is ever in the we set prise, it is one of the a time him, in a g Ela(Mrs or column, and latels to Co. a

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## POWERFUL AND INEXPENSIVE BUSINESS SOFTWARE FOR ZX81, T/S1000 and T/S1500 COMPUTERS

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A word processor is to a computer user what a typewriter is to a typist, except that the former has more advantages than the latter ZX-Text can operate in 15-64K RAM providing from 1300 to 6500 words per document. It features 6 different options, write, read, edit, print, save and clear text. Text is written on a per-line basis with quick speed and with horizontal back-space and delete capabilities being available. You can also access the editor directly from write mode and vice-versa. Text can be proof-read on a per-line basis allowing for enough time to determine if any editing is needed. The text editor allows a line of text to be deleted, inserted, replaced and listed for edding. You may also change a word or expression within a line, stop or start text while it is scrolling up the screen, begin reading text from the first line of the file, reanter write mode from the editor, return to the main-menu or create a window so that you can read-edit two files simultaneously. The print option takes text displayed in 30-column formation the screen and outputs to either the ZX/TS printer. (With Memolech's Centronics Parallel Interface 80-column and lower/ higher - case output is possible.) Files may be saved on tape cassette with the use of one single command, or by the same token they can be erased from memory / storage so that the full capacity of the program can be used for other purposes such as composing letters. reports, articles, memos, standard forms, instructions, ads, graphs, telephone directory, lists of customers, members, triends etc. Also copies of files are always less expensive and easier to run then using a photocopier. Other advantages are savings in time, paper, ink, correcting mislakes and adding afterthoughts more efficiently than doing them through either handwriting or using a typewriter

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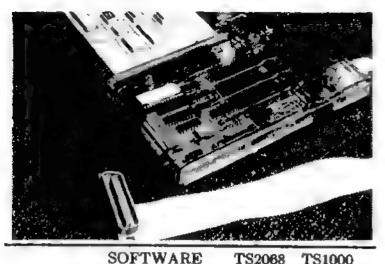


Time management is an important aspect of any serious business and personal agenda. Planning how to spend our time leaves us better prepared before and while we are spending it and we remain better organized after we finish spending it. ZX-Calendar operates in 15-84K RAM affording 25 appointments in 16K, 100 in 32K or 180 in 48K and 64K. Each appointment record holds a maximum of 220 characters. The main menu includes enter search/check/sort, change, save, clear and print arty and all appointments made on a apacific data or with any party. Output to either the ZX/TS printer is permissible. This program. will permit you to remember to do something or to be somewhere important by cataloging your answers to six questions that you must account for an order not to waste time when it is scarce: when, with whom, at what time, for how long. where and what are you going to discuss and conclude when you get together with someone else? The program lets you permanently originate, record, classify, search, sort calculate, modify, summarize, obtain a written report and store your answers to the preceding questions so that you will not forget what you decide to do with your time. This program identifies your time according to when you are going to spend it and with whom you are going to share it. Through these forms of tabeling appointments you are able to verify or modify how your time is budgeted without wasting ink, paper or more time trying to remember what you said to vourself or what someone else and to you or where you placed certain written messages that you now can't find With this program you will know where you can find exactly what you need to know about where you want to and have to be or where you have been before you get and after you got there. Thus, ZX-Calendar will let you plan your time so that you will nover have to worry about what is ahead or what dame before, for you will always know, by using it. to never be caught astray by any time-frame.

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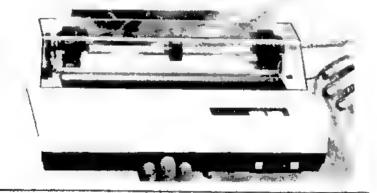
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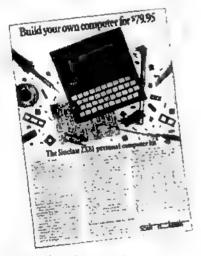
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## CK Type

A NEW "STANDARD" FOR "FOOL-PROOF" TYPING T92069 PROGRAM LISTINGS IN MAGAZINES

BY STAN LEMKE

One of the really great things about attending the 1987 TS Computer Pest was meeting and talking to all the great Timex/Sinclair enthusiasts! What's more, all the people that type-in and use programs presented here in TDM. Several people commented on the difficulty of typing in these programs, and then debugging them. The longer the program, the more difficult the task. As an aid in this endeavor, I've created CK TYPE.

CK TYPE will give a short analysis of every line in your BASIC program. It provides the following information: LINE NIMBER, number of BYTES used to create the line, and a CHECKSUM of these bytes. If a program is submitted and the CK TYPE output is provided for the listing, you will be able to type in your copy, run CK TYPE on it, and very quickly know which line(s) might need corrections. (Note: OUTPUT is routed to the screen and to the TS2040 printer with LFRINT, simultaneously.)
The LINE NUMBER lets you check line-by-line the

accuracy of your listing. A line is the BASIC program line following a number (1 to 9999), and may be 1 word, or a full screen in length.

Number of BYTES used is dependant on the number of characters you type (including blanks and embedded attributes) and helps you find those missing "spaces".

CHECKSUM helps you find typing errors such as misspelled variables, errors is data statements, and even transposed characters. It is not "fool-proof", as compound errors could offset each other, but it sure helps. (Note: CHECKSUM for upper and lower case letters is different, so be sure to use the same case as the listing you are typing!)

Listing "A" gives you the CK TYPE Basic program. Simply type it in as is. If you do not have TIMACHINE (the compiler from NOVELSOFT), then you can delete/skip lines 9987 to 9990 as these are TIMACHINE directives. When you are sure the program is typed correctly, save it to tape with: SAVE "CK TYPE" [ENTER].

#### Listing A

9987 REM ! LIST 9988 REM ! LPRINT 9989 REM ! INT +START, STOP, BYT, LI NE, LENGTH, SUM, ODD, I 9990 REM ! OPEN # 9991 LET start = 256 \*PEEK 23638 + PE EK 23635: LET stop \* 256 \*PEEK 2362 8 \*PEEK 23627: LET byt = start 9992 LET line = 0: LET length = 0: L ET sum = 0 1993 LET line = 255 \*\*DEEK but \*\*DEEK NEXT 1 9996 PRINT Line; TAB 6; ": "; lengt h; TAB 13, ": "; sum 9997 LPRINT (ine; TAB 6; ". "; leng th, TAB 13; ": "; sum 9998 IF bytkstop THEN GO TO 9992 9999 STOP

#### Eistino B

7899123455789 88899999999999 999999999999999	4 4 4 4 9 4 9 9 9 9 9 9 9 9 9 9 9 9 9 9	:	9942265551994 967265551994 967265551994 45514554554 4455145455	

Listing "D" is a POKE table to create a machine code version of CK TYPE (if you do not have TIMACHINE). The first column defines the memory location of the number in column 2, column 1 + 1 is the memory location of column 3, column 1+2 is the memory location of column 4, etc. You can create your machine code version by poking the appropriate memory locations with the corresponding values: POKE 64888,205 [ENTER]. 64889,58 [ENTER]. POKE 64890,255 [ENTER]....SAVE this to tape with: SAVE "CK TYPE" CODE 64888,460 [ENTER]. To use, LOAD the BASIC program you wish to check, LOAD "CK TYPE" CODE 64999,460 and run with RAMDOMIZE USR 64888 [ENTER].

I hope that CK TYPE is widely used in the TS2068 community as a way of easing the pain associated with typing in program listings! (Editor's Note: Please pass the word around about CK-TYPE, especially those of you connected with TS user groups and newsletters. Stan has come up with a standard that is common in many other PC magazines. Additional copies of this magazine can be purchased by those interested in CK TYPE for just \$3 postage paid each.)

The program is then ready to RUN. Type RUN [ENTER]. The output it creates will match listing "B" if you have no errors. The first column from listing "B" is the LINE NUMBER, column 2 is the number of BYTES used to create the line, column 3 is the line CHECKSUM value. Non-TIMACHINE versions would start with the line number 9991. To use this version with other BASIC programs, make sure that your other program does not use lines 9991 to 9999. Then MERGE CK TYPE with your other BASIC

program, and RUN 9991 [ENTER].

If you use the TIMACHINE compiler to compile this program, it will produce listing "C" and a machine code routine that will be located at 64888 and be 460 bytes long. SAVE this to tape with SAVE "CK TYPE" CODE 64888, 640 [ENTER]. To use this, LOAD in your BASIC program, LOAD in the machine code program with: LOAD "CK TYPE" CODE 64888,460 [ENTER], and run with RANDOMIZE USR 64888

[ENTER].

#### Listing C

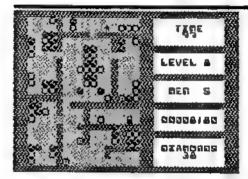
LINE		+0 64888	#FD7	8	
stop. byt line. lengt sum odd	55 55 65 65 65 65 65	257 #F 263 #F 263 #F 263 #F 2833 #F 333 #F 3334 #F 26334 #F 26334 #F 26334 #F	F33 F3A F3F IT IT IT IT IT	55348 55358 55352 55358 55358 55358 55358 55358 55358	######################################

TIME MACHINE @1986 Cameron Hayne

H/C. 460 BYTES + 20 BYTES FOR M/C VARIABLES (BASIC WAS 557 BYTES)

MAVE "m/c"CODE 64898 469 LORD "m/c"CODE 64888

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## Sketchit - G

SKETCHIT-G is an artist type of program that exploits the many capabilities of the TS2068 computer to produce graphics of all sorts on the visual screen. These displays can be copied by the TS2040 printer and/or saved on tape for future recall and merging. The Timex computer has several resident functions that can be utilized for this purpose and SKETCHIT-G is designed to coordinate all of these capabilities into a single, unified program.

The principal routine of the program is one of drawing straight lines by plotting pixels in any of the EIGHT cardinal directions, simply by touching one of a selected cluster of eight letter keys. Most artist type of programs only go this far. Although useful in an over-all drawing program, this feature is limited in what it can do. We need more.

Straight lines in directions other than the cardinal ones can be produced by using mathematical conalderations, and SKETCHIT-G does this to produce lines

in two other ways: a) by using the pixel coordinates of the line terminals or, b) by using the coordinates of one terminal and its angular direction and pixel length. All three of these methods may be necessary in unhampered, graphical construction.

The TS2068 has a built-in facility for drawing circles and arcs of circles, but except for full and half-circles, the facility is impractical and difficult to control. SKETCHIT-G uses only that part which it does well, and relies upon mathematical concepts to draw arcs. But don't be scared off. The mathematics will be done by the computer. And, it has INPUT prompts that clearly tell you what data it needs from you and in what

SKETCHIT-G is a user-friendly program. It includes an error trapping device that conveniently refuses to allow the program to get hung up if you should make, or try an "illegal" entry. But this can back-fire if you want to get back to the listing as BREAK does not work in the ON ERR mode. BREAK is treated like another error, and the program continues. Hence, the zero key has been set aside for an escape device. Remember this!

Continued Next Page ...



1 REH \*\* "R-44a", 6-8-86

2 REM \*\* SKETCHIT-G by Warren Fricke

5 BORDER 4 PAPER 5 CLS 6 LET x=125: LET y=90: LET k= DIM q\$(32) 10 DIM w\$(32): DIM (\$(32) 20 INPUT "Hit ENTER to Continu

100 PAUSE 180: 60 TO 26

200 REH ## NEW PLOT COURDINATES 210 INPUT "NEW X-Value, 8 to 25 215 IF x 49 OR x 255 THEN GO TO

220 INPUT "NEW Y-Value, 8 to 15

225 IF 948 OR 93167 THEN GO TO 220 GO TO 25

360 GO TO 25

300 REM ## FULL CIRCLES 305 PRINT AT 0,0;94

310 INPUT "X Center point = ";x

320 INPUT "Y Center point = ";g

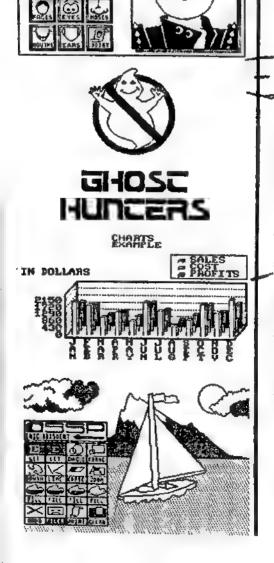
330 INPUT "Radius = ";r 346 INPUT "0 to DRAU; 1 to ERAS 350 CIRCLE INVERSE 5;x1,41,F

15



400 REM \*\* LINES & SEMI-CIRCLES 405 PRINT AT 0,0; qs 410 INPUT "Starting X-coordinat = "; x1 420 INPUT "Starting Y-coordinat # ", y1 430 PLOT INVERSE 1, x1, y1 440 INPUT "X Coordinate differe ce = ";x2 450 INPUT "Y Coordinate differe nce = ",y2
450 INPUT "0 for a line; 1 for
a"," half-circle = ";t
470 INPUT "0 to DRAW; 1 to ERAS # "; b 480 DRAU INVERSE b; x2, y2, t\*PI 490 GO TO 25 500 REM ## STRING\$ INPUT 510 INPUT "ROW NUMBER = "; C 515 IF r<1 OR r>20 THEN GO TO 5 10 INPUT "COLUMN number = "; c INPUT "STRINGs = ";ms PRINT AT (,c.ms GO TO 25 520 600 REM ±± VECTOR INPUT 605 PRINT AT 0,0;q\$ 616 IMPUT "Origin: X-coordinate = ";x1 520 INPUT "Origin: Y-coordinate = ";91 630 INPUT "Vector length = ";L 640 INPUT "Angle: 0 to 360 deg. 650 INPUT "8 to DRAU; 1 to ERAS E = "; b 660 FGR r=0 TO L 670 PLOT INVERSE b, x1+r4COS (A\* PI/180), y1+r4SIN (A\*PI/180) 680 NEXT r: GO TO 25 700 REM ## ARCS of CIRCLES 705 PRINT AT 0.0;q# 710 INPUT "X Center point = ";x 720 INPUT "Y Center point = ";u

739 INPUT "Radius - ":c



740 INPUT "Initial angle (deg) 750 INPUT "Terminal angle (deg) 760 INPUT "0 to DRAW; 1 to ERAS E = ",b 770 FOR A=21#PI/160 TO 22#PI/16 0 STEP 1.5/f 780 PLOT INVERSE b; x1+r4CDS A,Q 1+r\*SIN A 790 NEXT A: GO TO 25 800 REM ## TITLES-COPY DISPLAY
810 ON ERR RESET
813 PRINT AT 0,5; FLASH 1; ENT
ER A TITLE HERE
816 INPUT "#1 TITLE. 32 Charact
ers, max."; is
820 PRINT AT 0,6; is
830 INPUT "#2 TITLE. 32 Charact 830 INPUT "#2 TITLE. 32 charact
ers, max."; ws
840 PRINT RT 21,0; ws
850 INPUT "Get PRINTER ready &
hit ENTER"; zs. COPY
870 INPUT "INP. Y for 2nd COPY;
etse N ", zs
880 IF zs="y" THEN COPY
885 PRINT RT 0,0; qs: PRINT AT 2 1.0;9\$ 890 GD TO 22 900 REH ++ SAVE DISPLAY 910 ON ERR RESET 920 INPUT "Get RECORDER ready; hit enter"; 2\$ 930 SAVE "SKETCHIT"SCREEN\$ 940 GO TO 22 1000 REM \*\* EXIT ON ERR HODE START OVER START CUER 1905 INPUT "INPUT: C-CONT. TART ",25 N=RES

How to use SKETCHIT-G might best be explained by describing what the dedicated keys do. First, there are BIGHT direction keys. These are shown in Figure 1. The arrows show the direction of travel each particular key controls. The middle, or "8" key, has been selected to turn off pixel "flashing". Flashing has a long CN cycle when in the draw mode and a long OFF cycle when in the erase mode. Pixels are small. One must look close to discern this difference. Also, erase, the pixel must retrace exactly the path that it took to draw. And especially in the case with curved lines. This means that it must traverse the line in the same direction. This is because the finite size of the pixel allows only an approximation of the true line, and the same line might be drawn with other pixels in reverse.

TART ",2\$
1010 IF Z\$="[" THEN GO TO 22
1020 IF Z\$=""" THEN CLS : RUN

1030 IF zs<>"c" OR zs<> "n"
THEN GO TO 1005

The area set aside on the screen for these graphics is all of that covered by screen lines number 1 to 20 inclusive. Line 0 and Line 21 have been set aside for titles, remarks, etc. You may draw in these lines, but avoid doing so. It is suggested that a screen grid showing pixel coordinates plus line and column numbers be used and that the desired design be initially sketched out in pencil with terminals and angles of lines be identified by coordinates and/or degrees. This information can then be transferred to the computer line by line in almost any order. Of course one is helped a bit by having some drafting skill to do graphics, but all skill in this application is a low level requirement.

The following is a tabulation of what action each of the number keys produces:

- 1 Relocates the pixel PLOT coordinates.
- 2 Full circles by the CIRCLE command.
- 3 Lines and hatf-circles by
  the DRAW command.
  4 STRINGS. Can accept any
  character or group of char
  acters, spaces, keyboard
  symbols, pre-fabricated
  UDG's, etc.

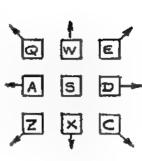


FIGURE - 1

300 135 900 EXAMPLES SKETCHIT #2 TITLE LOCATION

WI TITLE LOCATION

FIGURE - 2

- 5 Lines where start, tength, and direction are known. These are called vectors.
- 8 Arts of circles.
- 7 TITLES & COPY the display. Have a printer ready.
- 8 SAUE the display on lape, for future work, Have re-corder ready and running.
- 9 Exchange DRAU and ERASE
- B EXIT the ON ERR mode. Gives a choice to continue or CLS and start over.

Figure 2 shows a variety of shapes and designs produced by the action of SKETCHIT-G. Let us run thru one of the preceding actions...say the arc drawing feature initiated by the "6" key. In particular, refer to the arc shown in the upper left corner. To draw an arc, we must know its radius and the center point of that radius. We must also know what sector it covers and in this program the sector is defined by the starting radius and the ending radius. In turn, these are measured counter-clockwise in degrees from an arbitrary horizontal line, the initial line. In this example, the starting radius is 30 degrees from the intitial line and the terminal radius is 150 degrees from the initial line. Of course none of the straight lines that are in this arc sample are needed to draw the arc. They are included here merely to help visualize the arc drawing parameters, and how the arc relates to them. Notice too, that the arc draws itself in a counter-clockwise direction. All of the curves in this program, circle and half-circle included, develop in this same way. All angles are measured form the same horizontal, initial line, counter-clockwise from 0 to 360 degrees. This concept is more or less customary in mathematics and related subjects.

You will note that the "3" key is for both straight lines and half-circles. The straight line is defined by its starting coordinates and "pitch". Pitch here means how far up or down and how far left or right the second terminal is from the first, measured in pixels. If you are using the "3" key for drawing half-circles, then the line is not drawn. Instead a half-circle is drawn for which the line would be its diameter. And the halfcircle plots from the initial coordinates, counterclockwise to the second terminal of such imaginary lines.

One other thing. Since the program is in BASIC and a lot of calculation is performed, you may notice that key response and INPUT prompting is slow at times. A good rule to follow: look at your INPUT data on the bottom line of the screen before pressing ENTER.

The various sub-routines in the program listing are identified by REM lines to help you to analyze it and to see what makes it work. Have fun.

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#### Dear MSCRIPTERS:

by Jack Dohaney

When I first started customizing MSCRIPT a couple of eons ago, I sort of promised a semi-regular newsletter to keep users abreast of latest developments. After two issues it died. Why? Because suddenly there were more Mscript owners than I could cope with. I simply don't have the resources (time & money) to do mailings to so many people.

Now it appears that TIME DESIGNS may serve as an excellent vehicle for such a newsletter. It may appear sporadically, since I tend to say something only when I

have something to say.

#### BUG REPORT (Hey, I'm only human)

Bug \$1: If your MS5A won't Add Text from wafer, then BASIC Line 375 needs fixing. Should be: 375 NEXT I: PRINT " "; INVERSE A; C\*; INVERSE Z;" "; IF C\*="L" OR CS="A" OR NOT U THEN RETURN Bug \$2: If you have an AERCO Interface and your

printer messes up when printing tex, then you probably need Version 5.1. See VERSION REPORT below. Stock Mscript's AERCO output routine had sneaky flaws which hid from me up to and including version 5.0. These flaws cause the strobe generated by the AERCO Interface to sometimes be too long for many printers, with wierd results. The strobe is the signal from the interface to the printer that says: I got good data for you NOW. The strobe should last no longer than the data, but long enough for the printer to notice it: a few microseconds. With the AEROO Interface, strobe duration is controlled by software rather than hardware, and interrupts must be OFF when the strobe is initiated. If an interrupt occurs after the strobe is started, the strobe will be too long for some printers.

Another output routine flaw can let printers lacking a "print-error" signal generate a "false error signal" which aborts printing prematurely.

The problem described by Mel Rout in the "TS Communique" column on page 5 of the March/April 87 issue of TDM, indicates he needs Version 5.1 or higher. Joe Williamson's reply can probably be disregarded, with thanks for the effort.

Thanks to Jerry Chamkis of AERCO and P.E. Skipper of the world at large, for helping to defunigate this one. Actually it's two separate bugs, but I call it one. All 3 of my printers, of course, work perfectly with Version 5.0. Alas, all printers are not created equal, but all should work perfectly with V5.1 and higher.

#### VERSION REPORT

Version 6 is in the works. I decline to speculate as to when it will be ready, or to describe new features in advance. Now's the time to send me your suggestions. Customized Mscript users who have "registered" with me and paid their dues will be notified when V6 is available.

Versions between 5 and 6 (such as 5.2) are "intermediate" versions, steps along the way toward V6. BASIC Line 1 tells full version number. The latest version can always be obtained by request. Payment is in the form of voluntary donation, as usual.

VERSION 5.1 corrects sneaky machine-code flaws in the AERCO print routines of versions 5 and below. The pokes necessary to upgrad from V5 to V5.1 are too

extensive for publication here.

VERSION 5.2 changes BASIC so that a backup may include current text. This has several uses: your backup may include your letterhead and/or usual printcode definitions. Or you can reload work-in-progress all at

17

once, rather than reloading first the program and then the textfile. Version 5.2 simplifies the View Memory facility, to make room in BASIC for Backup's includetext function.

There are at present four "standard varieties" of Customized Mscript: MS5T for cassette tape only, MS5A for A&J and cassette, MS5D for AERCO disc and cassette, and MS52 for ZEBRA disc and cassette. SPECIAL VARIETIES of Customized Mscript are available for use with Tasman and Byte-Back serial interfaces and for RAMEX disc, but not yet for Oliger or Larken disc. I would need those devices on loan in order to develop such varieties.

#### DUES REPORT

Many Customized Mscript owners have not "paid their dues", probably because they're ignorant of the big picture. The facts are these: I do NOT hold the Mscript copyright and cannot legally sell Customized Mscript, or control its distribution. Dealers who distribute Customized Mscript rather than Stock Mscript do not pay me a cent. The only compensation I get for the enormous work of customizing Mscript comes directly from happy and fairminded users in the form of voluntary donations. To date I have been compensated for my work at the rate of roughly \$2 per hour. My thanks to all Customized Mscript users who have registered, and paid their dues or expressed their appreciation.

#### THE FUTURE

I believe that the wheel needs to be re-invented continuously. Were it not, we'd still be riding around on round rocks instead of steel belted radials. I plan to go right on improving Mscript and other things as long as possible.

Jack Dohany, 390 Rutherford Ave., Redwood City, CA 94061 (415) 367-7781. Send legal size SASE for list of available "Fairware" programs.

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#### ZEUS UTILITY

by Richard Hurd

5 REM

ZEUS SOURCE CODE TO MSCRIPT CMSV5 or TASWORD II CONVERSION

(C)1987 Richard Surd

10 REM This program uses and is based on the mnemonics looku ptable from the ZEUS assembler.

20 PRINT 'TAB 13; "Z2M/T"'''
Conversion routine to convert
Zeus formatted Source Code to
either or both;"'' Mscript (
CMSV5T)"' TASMORD HI"
30 BERP .1,7: PRINT '''TAB 10; "Please LOAD"''TAB 3; "ZEUS (Fo
TMAT) Source Code"
40 LOAD ""CODE 32768
50 LET length=USR 61431: PORE
46927+length,255
60 CLS: PRINT ''' Press appr
opriate key"'" 1) MSCRIPT (CMS
V5T)"" 2) TASWORD HI"" 3) BOT
H 1 & 2"
61 LET 1=CODE INKEYS: IF 1=COD
E" THEN GO TO 61
65 IF 1<49 OR 1>61 THEN GO TO
HI
70 IF 1=49 OR 1=51 THEN CLS:

70 IF i=49 OR i=51 THEN CLS:
PRINT ''' Saving Z2Mfile CODE
46927, ";length: SAVE "Z2Mfile"
CODE 46927, length: IF i=49 THEN
GO TO 100
80 LET length=USR 61556: POKE
61552, 79: POKE 61553, 183: POKE
61554, 48: POKE 61555, 117
90 PRINT '" Saving Z2Tfile COD
E 30000, ";length: SAVE "Z2Tfile
"CODE 30000, length
100 CLS: PRINT '" TAB 4; "That'
8 It!": STOP
119 LOAD ""CODE: CLEAR 29899:
RUN

120 CLEAR : SAVE "Z\_2\_M/T" LINE 110: SAVE "Z\_2\_M/T"CODE 61015.

810

The following routine converts ZEUS source code files into an ASCII file for either of the two most popular TS2068 word processors: MSCRIPT and TASWORD TWO. A hex dump is included for ease of data entry.

41 ØA 41 44 43 20 Ø8 41 44 44 20 Ø8 41 46 27 ØA 41 46 ØA 41 4E 44 20 Ø8 EE67 41 46 ØA 41 45 44 20 ØQ 42 ØA 42 43 ØA 42 49 54 20 Ø8 43 ØA 43 41 4C 4C 20 Ø8 43 43 46 ØA 43 5Ø 20 Ø8 43 5Ø 44 ØA 43 5Ø 44 52 ØA 43 5Ø 49 ØA 43 5Ø 49 62 ØA 43 5Ø 4C ØA EE77 EE7F EE87 EKOF **EE97** 00 44 44 41 41 00 44 45 00 44 45 43 20 08 44 45 48 42 20 08 44 45 46 4D 20 08 44 45 46 53 20 08 ER9F EEA7 REAR **33**:87 ERRE 44 45 46 57 20 08 44 49 ØA 44 49 53 50 20 Ø8 44 4A 4B 5A 20 Ø8 45 ØA 45 EEC? EECF 49 ØA 45 4E 54 ØA 45 51 56 2Ø Ø8 45 58 2Ø Ø8 45 EED7 EEDF 58 58 ØA 48 ØA 48 41 40 54 ØA 48 40 ØA 49 ØA 49 4D 20 Ø6 49 4E 20 Ø8 49 4E 43 20 Ø6 49 4E 44 ØA 49 4E 44 52 ØA 49 4E 49 EEE7 RERF SEF7 EFF EFØ7 RIGE ØA 49 4E 49 52 ØA 49 58 ØA 49 59 ØA 4A 5Ø 2Ø Ø8 EF17 EF1F 4A 52 20 08 4C 0A 4C 44 20 08 4C 44 44 0A 4C 44 44 52 0A 4C 44 49 0A 4C EF27 44 49 52 ØA 4D ØA 4E 43 ØA 4E 45 47 ØA 4E 4F 5Ø EF37 EF3F ØA 4E 56 ØA 4E 5A ØA 4F 52 2Ø Ø8 4F 52 47 2Ø Ø8 EF4F

Hex Dump of Z\_2\_H/7

#### Beta Basic 3.0

## Over 100 New Commands For Spectrum/Emulated 2068 Reviewed by Robert D. Hartung

When I first leaded Beta Basic and began working my way through its well-written 90-page manual, my impression was, "Wow! This is almost like having a poor man's QL" Of course this extension to Sinclair Basic must work within the hardware limitations of a T/S environment, but after a year of learning my way around it a bit I am even more convinced that it provides our "toy" computers with what is probably the most powerful Basic programming language available on any 8-bit micro today.

Hany of its over 100 new and enhanced commands and functions have several variations. Except for TS2068 commands that are not available in Spectrum mode (STICK, SOUND, ON ERR, RESET, FREE) it is completely compatible with Basic programs that have been entered and saved on either a TS2068 or Spectrum. (Free bytes function NEM6, and ON ERROR line no. and ON ERROR statement: statement: ... are supported.) This means that any T/S Basic program that will fit under a 46679 RANTOP may be loaded in with BB in-residence and and its toolkit features used to edit, split, join, re-number, or make block-moves or copies in the listing with all discrete line-references changed accordingly. Keying in a zero before any line number immediately brings that line into the editing area without shifting the listing display. AUTO line numbering in any step may be turned on or off.

After all this, if no BB-specific command words have been inserted into the listing, it may be saved again as a TS2068 or Spectrum program, or selected blocks of the listing or data in memory may be saved from the complete program. If saved with the special line 8 containing BB directives, it may contain any of the BB commands and will run with the BB code in-residence. As supplied, BB is cassette and MicroDrive competible, with adaptations available that will work with WafaDrive as well as Opus, Kempston, Oliger, and other Spectrum-compatible DOSs. It takes about 125 seconds to load from taps.

Personally, I would think this program worth having for its editing features alone, but that is barely the beginning of all that it does. Probably the one must powerful feature is that procedures can be created, each of which may then be called by a single word. In effect, this allows the user to create a library of new command words, limited only by your ingenuity and available memory. Procedure parameters and internal variables designated as LOCAL do not affect other program variables which have the same names. DEFAULT values for parameters and other variables may be pre-defined. DATA may be used as a procedure parameter.

By using stored addresses, FOR-MEXT loops run at constant speed anywhere in the listing, unlike T/S Basic, and are about 2 times faster at the first line, 5 times faster at the 100th, and 17 times faster at the 500th line. GO TO and GO SUB are also faster and RETURH is just as fast from the last line as from the first. The DO-LOOP structure is supported as well as WHILE, UNTIL, EXIT IF, ON, and BLBE. SORT will re-arrange any array of strings; numbers or letters, in ascending or descending prefer—400 of them in about 3 seconds. INARRAY and INSTRING will search for any given target string. ITEMU checks for the last item of DATA and whether any item is numeric or a string. READ LINE allows READ to work with DATA that otherwise would need quotes.

Graphic and display control are provided in any of 127 user-defined windows, with wraparound gixel-by-pixel and attribute ROLL in any direction as well as SCROLL in any direction. FILL will surround all closed figures with designated PAPER color or fill any closed figure at given coordinates with designated 18K color. CSIZE provides characters in any size from 80 columns per line to one filling the entire screen, as well as reducing or enlarging any text or any portion of the display put into a string by GET, which you may then PLOT anywhere you want it on the screen. Plotting scale and 0,0 origin coordinates may be set with four special variables.

Other commands and functions include OVER 2 which allows superimposing printed or plotted text or graphics without affecting what is already there. STRINGS will print any character or string a given number of times. Cursor control codes may be imbedded in text to change print positions in the display. USING or USINGS may be used to align printed columns of integer and decimal values and truncate to the desired number of places. LLIST expands token-words and TAB is translated to the proper number of spaces before being sent to a full-size printer. (The Profile printer driver routine will work in BB/ Spectrum mode by using POKE 63688,84 and POKE 63689,31 before moving it just below the BB code.) SCRNs recognizes UDGs along with the normal characters recognized by SCRBENS. A real-time CLOCK provides options of display and/or audible alarm and/or timed GO SUB.

KRYWORDS n provides one-key entry of Keywords. letter-by-letter entry, or combination of both. The KRYIM command actually can be used to create self-writing programs. All variables and their contents may be listed, or all lines that contain a given reference or procedure may be displayed in succession for examination or editing. The ALTER ... TO ... command may be used that with caution!) to change every occurance of a given word or

therefore equence wherever it appears in memory. A TRACE function may be used to single-step through a program for de-bugging. Strings, arrays, or blocks of data may be displayed for editing and may be moved, joined, or copied in memory. Any part of memory may be put into a string. LET a=x,b=y,c3="z" is supported.

Any or all character keys may be user-defined to produce a complete program line or a conversion formula or an entire subroutine with one key-stroke, and these definitions may be saved with the program. Hex and decimal conversion functions are provided, as is decimal to binary and bit-by-bit AND, OR, and XOR of two numbers. GLBAR n<768 moves RAKTOP without loss of variables. BREAK will stop machine code endlass loops. Listing formats indent wraperound lines to the fifth column for easier reading. Options provide listing of multi-statements on separate lines, with some commands indented further.

A random number function is 2 1/2 times faster than RNDen. SINE and COSE functions give four-place accuracy 6 times faster than SIN and COS. DPREK yields decimal result of a double PREK and DPOKE does LSB. MSB double POKE of a decimal number to a given address. CHARS converts 0-65585 integer values to two-character strings and NUKBER converts them back, at a saving of 60% in use of memory. MOD gives remainder of one number modulo another.

5+5+5+5+5+5+5+5+5+5+5+5+5+5

You've heard of PROFILE 2000.
You may have even heard of PROFILE +3!
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Since no review can provide the "picture that is better than a thousand words," with the permission of BetaSoft I have written a 20%-byte demo which shows typical listings and runs actual examples of about 85 of the new and enhanced commands of this remarkable software for the Spectrum/Emulated TS2068. It is available for \$5.00 to cover the cost of postage, packaging, tape, and handling by writing to me at 2416 N. County Line Rd., Huntertown, IN 46748. Please note that, to protect BetaSoft's copyrights, the version of Beta Basic included to drive this demo will NOT allow editing or use with any other listing but the demo may be used as a tutorial when loaded with normal BB. Beta Basic 3.0 may be purchased for 15.50 in British pounds (about \$25.00) from BetaSoft, 92 Oxford Rd., Noseley, Birmingham BI3 98Q, England. Payment may be by international money order, or MasterCard for easier currency exchange.

#### Next Issue:

Professional TASWORD TWO. STARFLEET 2068.

"Beyond the User Manual" New series for the ZX81/TS1000/TS1500.



### **Programming Concepts**

by Albert F. Rodriguez



PROGRAMMING CONCEPTS has been a multi-part feature in TIME DESIGNS, and deals with programming on the Sinclair EX81 (or TS1000/TS1500). The chief example used in this series is a game program called "ZX81 TIC-TAC-TOE" which has been discussed extensively. In this installment we feature the actual SASIC listing of the program.

If readers do not wish to type in the listing, there is a cassette tape available (non-listable) for \$12 from the author: Albert F. Rodriguez, 1605 Pennsylvania Ave., #204, Miami Beach, FL 33139. Also, you can get a print-out of this listing along with the array content and program declarations for \$6.20 ppd (foreign buyers add \$2.00 for the cassette, or \$1.00 for the listing).

In the next issue, we will have a complete line explanation of the program and more.

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ZX TIC TAC TOE

STREM "TTT. 5 SAVE "TTT LET 6 = 25 1 FOR 6 = 1 1 9 6 1 LET D\$ = 5.75 \$ 6 1005 CLS 1006 PRINT AT 12 NAMES AS 1007 PRINT AT 3 8, "TO STOP THIS 1000 PRINT AT \$.9, DURING EXECUTION" 1009 PRINT AT 7 8, "PRESS "BREAK 1010 PRINT AT 5,10, TO RESTART I 1911 PRINT AT 10,10. "TYPE " GOTO 7"""
1012 PRINT AT 11,5 'THEN, PRESS
"ENTER" KEY"
1013 PRINT AT 13,3, NEVER ENTER
"'RUN" OR "'CLEAR"
1014 PRINT AT 14,12, IF YOU DO
1015 PRINT AT 15,5; "YOU, THEN, M
RUE TO RELORD"
1016 PRINT AT 15,8, GAME FROM CA
SSETTE" 3014 NEXT J 3015 RETURN 4003 PRINT AT 2 22 (20) 4004 PRINT AT 19, (C) 1983 4005 PRINT AT 2,20,"(C) 1983 4005 PRINT AT 3,19,"A. RODRIGUEZ 4007 PRINT AT 17.1; "PLAYER TAKES

```
1000 PATAT AT 15 1 COMP. TER TAK
ES " 100
4008 PRINT AT 15.1. "PLRYER GETS
4008 PRINT AT 20.1 "MOVE: K$
5000 INAPAT AT 20.1 "MOVE: MOVE: K$
5000 INAPAT AT 20.1 "MOVE: MOVE: MOVE: K$
5000 INAPAT AT 20.0 "MOVE: MOVE: M
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           7062 MEXT R
7063 If WESCH THEM GOTO L'A
7064 IF CTRES THEM GOTO TOSE
7065 RETURN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          7064 IF CTRAS THEN GOTO TOSE
7065 RESURN DAY
7066 RESURN DAY
7066 LEST FRA DARW
7066 RESURN LINES
7070 GEST URN LINES
70714 GEST URN LINES
70714 GEST URN LINES
70715 GEST URN LINES
70715 GEST URN LINES
70716 GEST URN LINES
70716 GEST URN LINES
70717 GEST URN LINES
70718 GEST URN LI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PLATER
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        MAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                9007 RETURN

9003 GOSUB DSPL

9009 LET B 23

9010 GOTO 9005

9011 COSUB DSPL

9012 LET B 20

9013 GOTO 9005

9014 LET A 20

9015 FOR I TO 25

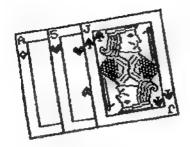
9016 IF I=1 THEN PLOT A B

9017 LET A 3 A 1

9018 IF I=3 OR I=11 OR I=21 THE
      5015 PRINT AT 21.0
      9017 6070 9000
6000 LET K:0
6001 LET X:25
6002 FOR Y:1 TO 9
6003 LET X:X+1
6004 LET U$-178$ X
6005 IF K$:U$ THEN LET N(Y):N(Y)
        5017
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        IF TL=T(J) THEN LET J=215
NEXT J
FOR J=1 TO 22
LET I=1
IF TL=U(J) AND C$(I) =R$(J)
LET K$=\%'\]
IF TL=U J THEN LET J=22
NEXT J
FOR J=1 TO 13
LET I=2
IF TL=5(J) AND C$(I) =A$(J)
LET K$=\0$(J)
IF TL=5(J) THEN LET J=13
NEXT J
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                7102
7103
7104
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  LET R=A+2
9020 NEXT I
9020 NEXT I
9020 GOSUB D35-
9023 LET A-4
9020 GOSUB DIN
9020 GOSUB DIN
9020 GOSUB DSP.
9020 LET A=024
9030 LET A=26
9031 LET A=26
9031 LET B=42
        +1
5005
        +1
6005 IF K$=J$ THEN-LET K=N(Y)
6007 NEXT Y
6009 IF K>=2 THEN GOTO 6013
6009 RETURN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   7105
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              057 89901N
057 89901N
0777777777777777
           6013 PRINT AT 21,1. "REPERT: TRY
        ACREM!
    6014 PAUSE 120
6015 PRINT AT 20,1,0
6016 PRINT AT 21,1,0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | AND | C$ (I) | AND 
    6016 PRINT AT 22,1,"

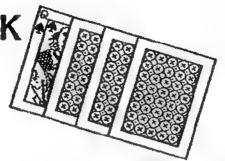
6017 GOSUB RDEFFU
6018 GOTU 8001
7001 FOR J=1 TI 9
7002 IF K*=C*( THEN LET C*(J) =
7003 NEXT J
7005 GOSUB IN
7006 GOSUB PXM
7008 GOSUB OUT
7008 GOSUB BY
7009 IF F*="GRAU" THEN RETURN
7008 GOSUB BY
7011 GOSUB SETJF
7011 GOSUB SETJF
7011 GOSUB PSTN
7010 GOSUB PSTN
7011 GOSUB RCD
7014 GOSUB RCD
7015 GOSUB RCD
7017 GOSUB RCD
7017 GOSUB RCD
7017 GOSUB RCD
7018 GOSUB CHK
7019 RETURN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                7112
7112
7114
7115
7116
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                9031 LET A=26
9032 GOTO 9024
9033 LET B=42
9034 FOR I=1 TO 11
9035 IF I=1 THEN PLOT A.8
9036 LET B=8+1
9037 PLOT A.8
9038 IF I=2 OR I=6 OR I=9 THEN
9038 IF I=2 OR I=6 OR I=9 THEN
9038 IF I=2 OR I=6 OR I=9 THEN
9040 LET B=B+3
9041 PLOT A.8
9042 NEXT I
9043 RETURN
9044 GOSUB DSPLY
9045 LET B=1
9047 FOR I=1 TO 12
9046 IF I=1 THEN PLOT A.B
9047 FOR I=1 TO 12
9046 IF I=1 THEN PLOT A.B
9050 LET B=8+1
9051 PLOT A.B
9052 IF I=2 OP I=8 THEN LET A=6
9053 IF I=2 OP I=8 THEN LET A=6
             7016
7017
7018
7019
7020
      7018 GOSUB CHK
7019 RETURN
7029 RETURN
7021 IF K*=C*(J) THEN LET C*(J =
7021 NEXT J
7024 GOSUB PST.
7025 RETURN
7025 FOR R=1 TO 8
7026 FOR R=1 TO 8
7027 LET L(R) =0
7028 NEXT R
7028 NEXT R
7028 NEXT R
7029 LET P=1
7030 LET P=1
7032 FOR J=1 TO G
7033 FOR J=1 TO G
7033 IF J=4 OR _=7 THEN LET P=P+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  9052 IF I=2 OR I=8 THEN LET 0=6
9053 IF I=2 OR I=8 THEN LET 0=6
9054 IF I=2 OR I=8 THEN LET 0=6
9055 LET 0=0-3
9055 LET 0=0-3
9055 LET 0=0-3
9055 GOSUB UIN
90650 RETURN
90650 LET 0=20
90651 LET 0=20
90651 LET 0=20
90652 LET 0=20
90652 LET 0=20
90653 LET 0=20
90655 IF I=11 THEN PLOT 0-0
90656 LET 0=11 THEN LET 0=0-2
90656 LET 0=11 THEN LET 0=0-2
9059 IF I=13 THEN LET 0=0-2
9070 IF I=7 THEN LET 0=0-2
9071 LET 0=0-3
9071 LET 0=0-3
9071 LET 0=0-3
9077 PRINT 0=0-3
9077 RETURN
9077 PRINT 0=0-3
9078 P
        7034 LET L(P)=L(P)+CODE Os(J)
7035 NEXT J
7036 LET P=P+1
7037 FOR J=1 TO 9 STEP 3
7036 LET L(P)=L P)+CODE Cs(J)
7039 IF J=7 OR L=8 THEN LET P=P+
             1
7040 IF U=7 OR U=8 THEN LET U=d=
      8
7041 NEXT J
7042 NET P=P+1
7043 FCR S=1 TT 9 ST5P 4
70445 NEXT S
70445 LET L(P+= P)+CODE C* S
70445 LET P=P+1
70447 FCR J=3 TT 7 STEP 2
70449 LET J=3 TT 7 STEP 2
7049 NEXT J
7050 FCR R=1 TD 8
7050 FCR TL*TL*L*L*R*
7052 NEXT R
7053 RETJCR*CT*+1
7055 LET LN=7069
7056 LET U=0
7057 FCR R=1 TC 8
7058 IF R=2 THEN LET LN=LN+2
7059 IF R>=3 THEN LET LN=LN+2
7060 IF L(R)=SCR THEN LET J=-R*
7061 IF L(R)=SCR THEN LET R=8
               7041
                                                                                           NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    2020 RETURN
9081 PRINT AT 16,6; """COMPUTER TO SEE WON"""
9082 PAUSE 900
9083 CLS
9084 RETURN
9085 GOSUB DSPLY
9086 PRINT AT 15,6; """GAME IS FORW
9087 PAUSE 900
9088 CLS
9089 RETURN
```

22



## High-Res BLACKJACK For the ZX81/TS1000/TS1500

by Fred Nachbaur



For many years now, we ZX81/TS1000/TS1500 users have had to contend with VVLR (Very Very Low Resolution) graphics. Not any more! With nothing more than a suitable static memory, mapped from 8-16k, we now have true high-resolution graphics for our machines!

By "suitable" I only mean that the static RAM's data must be accessible during refresh time. If you have a HUNTER Board, you can make a very simple modification to meet this requirement. Simply cut the line between the RAM chips pins 20 and edge connector pin 16A (RD\*); bridge the resulting gap with a 4.7k resistor. Now connect a diode with its cathode (banded) end to edge connector 23A (RFSH\*), and the other end to the RAM side of the new resistor. Alternately, contact SILICON MNT. COMPUTERS about our "SCRAM" board, which will do the job with no modifications.

Silicon Mountain also has "SCRAM HI\*RES EXTENDED BASIC", which gives you 38 new high-resolution commands from BASIC. The prupose of this series of articles is to give a tutorial on the use of SRAM HI\*RES, demonstrating how these new commands can be used to write spectacular graphics software...entirely from BASIC.

Editor's Note: You can contact Silicon Mountain Computers by writing to: C-12, Mtn. Stn. Group Box, Nelson, B.C., VlL 5P1, Canada. A complete line of interesting products are available for the Sinclair ZX81, TS1000 and TS1500. The "SCRAM" NVM Board is priced at \$39.95 postage paid; the "SCRAM" HI\*RES EXTENDED BASIC" software package is priced at \$24.95 ppd.; and other high-resolution graphics programs are available including the games DUNGEON OF YHIR and HIGH-RES CHESS.

Since this article presupposes that you have SRAM HI\*RES EXTENDED BASIC, I can already hear charges of "vested interest" in publishing a program that makes use of it. I must plead "no contest", but also point out that it is common practise for manufacturers in other fields to provide after-sale support via their trade magazines (like TIME DESIGNS). Granted, the SRAM BI\*RES manual gives all the basic info on this new operating system, much as your computer manual gives "all you need to know" about your ROM operating system. Still, many users will find it necessary to get additional explanation in the way of articles and sample listings, will attempt to get you familiar with the use of some of the new SRAM HI\*RES commands.

#### THE DOCUMENTATION

Before we get on with it, here is the documentation for the BLACKJACK program published here. Look over the artwork for this article for an idea of the displays you will be seeing; these are all ACTUAL screen dumps of inprogress games!



The game of BLACKJACK is one of the most popular casino games, and for a good reason; it is one of the very few casino games where you can actually have odds over the house. A skilled Blackjack player can actually (in the long run) come out ahead, because of an estimated 2% advantage. Compare this to horse racing, with an estimated 25% loss, or lotteries with a typical 50% loss!

#### GETTING STARTED

Start by hooking up your ZX81, TS1000 or TS1500 (with 8k static RAM and a Timex 16k RAM pack). Note \$1: Larger RAMs will work, but you will still need the static RAM in the 8-16k region. Many 64k RAMs WILL NOT work on the 1500, however. Note \$2: If you're using a TS1500, you'll still need the Timex 16k pack in addition to the internal 16k. This is for the hardware reasons unique to the TS1500.

The first thing we'll do is enter a program that actually will be run only once! This is because there isn't enough room in 16k if we include it in the main listing. The purpose of this is to set up a dimensioned string array to hold the character codes for the UDG's used to print the images of the cards. Incidentally, this little "trick" demonstrates a use for your static RAM even in non-high res programs; use it anytime you need to import or export data (variables) between programs.

Enter LISTING 1. You don't have to enter the REM lines, they are only provided to help with the graphic characters. Proof the listing, save it to tape just in case you "mess up" later, and run it. This dimensions CS(4,13,7,5), then proceeds to fill it. The characters it is filled with correspond to the UDG (User Defined Graphic) characters that will be set up in the main program. Note the significance of the dimension numbers: "4" (number of suits), "13" (number of cards in each suit), "7" (number of lines in each card image) and "5" (number of columns). Once the array is filled, the contents of the array is POKEd into your static RAM.

Now enter NEW, LOAD the SRAM HI\*RES core program, and delete the extraneous lines 3-9999. Now type in line 2 of LISTING 2. Note that this also deletes the 64-column PRINT driver routine, which we won't be needing in this program. Just for safety's sake, enter the following POKES, which prevent accidentally calling the deleted 64 column routine:

POKE 18080,208 POKE 18081,75

Then, LIST 2 and POKE 16419,2. This prevents your listing from getting stuck at line 0. Henceforth, using only LIST (number greater than 2) instead of LIST (only) then, enter the program lines starting at 9900.

Now comes the nice part. Enter RUN 9900. The CS array will be re-created, and filled with the proper contents from your 8k static RAM board! While we're at it, we define a few of the important variables that won't change throughout the program. You can now delete lines 9900 onwards, leaving you only with the line 2 REM and of course the line GOOD REM. Henceforth, NEVER USE RUN OR CLEAR, or you will destroy these variables!

Though this seems restrictive, look at how much memory LISTING 1: CARD PATTERN GENERATOR/DOUNLOADER

Though this seems restrictive, look at how much memory we have saved with this approach; the entire contents of LISTING 1!!

#### ENTERING THE PROGRAM

Now we're finally set up to enter the program. For your convenience, we're publishing the entire program in this issue, reserving the detailed tutorials for subsequent issues. This will give you an actual, running program, even if you may not understand how it all works.

I suggest using PAST mode for program entry. The most laborious aspect is entering all the UDG and sprite definitions starting at line 9000, so I suggest you do this first to get it out of the way. If this seems like a lot of work, consider this: you don't have to design the pictures, break them into individual UDG's, translate them to hex, debug, modify, and debug again. I already did all that. All you have to do is type in the numbers, proofing and correcting as required.

I should note that the separator characters (or commas) between the hex numbers can be anything you wish; I like commas, but you may prefer spaces, or whatever. Similarly, I used other characters between each UDG (group of 8 numbers) to aid in entering the numbers originally; this merely indicates which character the subsequent UDG defifinition relates to, and made it easier for me to perfect the images. They have no other significance. Again, you might prefer to replace these with spaces, asterisks, or whatever.

Remember, once you start entering the program you must NEVER use RUN or CLEAR. To guard against disaster, save to tape frequently. A few minutes spent saving, while you go get another cup of coffee or stretch your legs, will be well worth it if your kids stumble over your power cord or your cat jumps onto the RAM pack. After entering each group of lines (e.g. every 100) proof your work. Errors will be easier to spot if you are dealing only with a small group of lines. Be careful to type in the listing exactly; at some points, even an omitted semicolon or space will cause improper program operation.

When you're all done, and have saved to tape, get ready for the show. Make a final save to tape using GOTO 8900; this will then autorum after the SAVE (or subsequent LOAD). The program initializes all the UDGs and sprites at line 9000, jumping to the actual program start at line 2000 when complete. (Though it looks like it would take a long time to execute all those definitions, i.e., 128 UDGs and 26 sprites, it actually happens in less than a second!)

Next time we'll dissect the program, explaining why some of those weird commands are there and how they work. Meanwhile, have fun! Don't spend all your money in one casino!

#### BLACKJACK

This program simulates the casino game very closely even though it doesn't allow refinements like doubling bets or splitting aces, but it does have the capability of using multiple decks. Also, it deals from a "true" deck, making it possible for you to practice "counting cards", a skill which will dramatically improve your odds in an actual game. (Be forewarmed however, if you do count cards...do it discreetly since a casino will bounce you if it even suspects you of counting!) Also on that mote, I must add the following disclaimer: "High-resolution BLACKJACK is intended for amusement purposes only. It is NOT to be used for actual gambling."

On loading, the program will start by itself and ask for your "bankroll". This is how much money you have when you walk into the casino. Enter the amount you're comfortable with (\$100 if you're conservative, \$1000 if you're a high-roller, etc.). Then enter how many decks

S PAST

10 DIM C\$ (4,13,4,5)

20 POR S=1 TO 4 (174+5)

20 POR S=1 TOHR\$ (178+5)

50 LET U\$==CHR\$ (178+5)

50 FOR S=1 TO \*C

70 NEXT 5

90 GOTO 2000

100 LET C\$ (5,C,4,3) = U\$

110 RETT C\$ (5,C,4,3) = U\$

210 LET C\$ (5,C,4,2) = U\$

2200 LET C\$ (5,C,7,4)

2210 LET C\$ (5,C,7,4)

2210 LET C\$ (5,C,7,4)

2310 LET C\$ (5,C,6,4,2) = D\$

400 LET C\$ (5,C,6,4,2) = D\$

410 LET C\$ (5,C,6,4,2) = D\$

510 LET C\$ (5,C,6,4,2) = D\$

520 LET C\$ (5,C,6,4,2) = D\$

530 LET C\$ (5,C,6,4,2) = D\$

540 LET C\$ (5,C,6,4,2) = D\$

550 LET C\$ (5,C,6,4,2) = D\$

560 LET C\$ (5,C,6,4,2) = D\$

570 L

Actual Screen Samples
From "BLACKJACK"

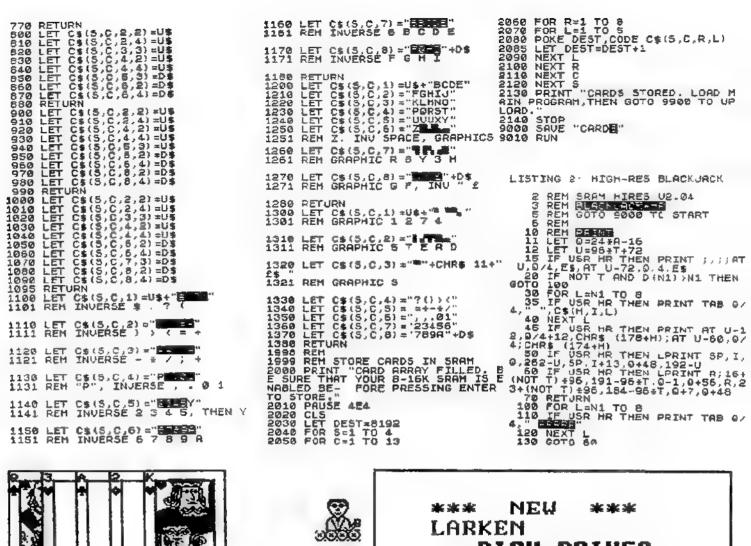
you wish the dealer to use. This can be one-deck (makes it easier to count cards, keeping track of how many face cards are still in the deck), or more. According to reports, most casinos use three to five.

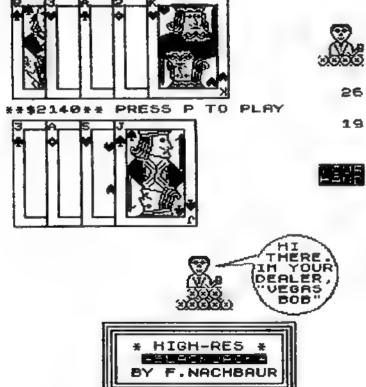
After shuffling the cards, the dealer asks how much you wish to bet. The "house limit" is \$2000, though you can of course change this by modifying the program. The dealer now deals two cards to himself and to you. His first card is face-up, subsequent cards will be face-down. Your cards will, of course, all be face-up.

Presuming that meither of you got Blackjack (ace and a 10-valued card), you are now asked "HIT?". If you want another card, press "Y". If you wish to stay, press "N". The idea is to get your hand as close to 21 as possible, without going over ("busting"). Face cards count 10, aces count as either 1 or 11. All others count as their face value.

The dealer's rules follow the convention used in most casinos. If he has less than 17, he must take another card. If he has 17 or more, he must stay. The exception is a "soft 17" (ace plus cards totalling 6), in which case he must take another card. After each hand, the dealer reveals his cards. Press P to play the next hand. (If you don't want to wait until all the cards have been turned up, simply hold down "P" and program will go on to the next hand between cards.)

If you get Blackjack, the house pays 2:1. (This is actually a little generous, but I'm a generous kind of guy...) On the other hand, it's obviously impossible for your computer to "pay off" if you do well, so the game will continue to play until you blow your wad, at which time it will insult you. (Isn't that a lot like life?) At the end of the game, you can press "P" to play again from the beginning, or "Q" to quit to the normal operating system.





OK, BAD BOB. LETS SEE YOUR BANKROLL. **\$1000** PLAY WITH HOW MANY DECKS?

## DISK BRIVES

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```
200 REM REM

210 LET R=CODE B$ (J:-N1

220 LET J=U+N1

230 LET H=INT :R (13)+N1

240 LET I=R-(H-N1)+13+N1

250 LET D (T+N1)=D (T+N1)+N1

260 IF NOT T THEN LET A (D(N1), N
 1) =H
270 IF NOT T THEN LET A(D(N1),2
   280 LET U=I

280 LET U=I

290 IF U>10 THEN LET V=10

300 LET D(T+5) =D(T+5) +U

310 IF I=N1 THEN LET D(T+3) =N1

320 LET R=D(T+N1)

330 GOTO 10

400 IF USR HR THEN PRINT AT 64,

410 IF USR HR THEN PAUSE VAL "9
 64-2+LEN
2410
 500 IF USR MR THEN PRINT ,; AT 8
4,N0,E$,E$,E$,E$," ".AT 84,N0
     510 RETURN
    510 RETURN
700 REM BEEFE
710 FAST
720 LET N=52*ND
730 DIM 8$(N)
740 FOR C=N1 TO 52
750 FOR L=C TO N STEP 52
750 NEXT L
760 NEXT C
800 REND
      800 RAND
810 FAST
      820 CLS
830 PRINT "PLEASE WAIT UMILE I
  850 PATH "PLEASE GAIT WI
SHUFFLE."
840 PAUSE VAL "120"
850 FOR C=N1 TO N
850 LET L*=8*(C)
870 LET Q=INT (RND*N)+N1
     870 LET G=INT (RMD+N)+N1

880 LET M$=B$(0)

690 LET B$(0)=L$

900 LET B$(C)=M$

910 NEXT C

920 IF USR HR THEN CLEAR

930 LET J=N1

940 RETURN
  940 RETURN
2000 IF USR HR THEN CLEAR
2010 IF USR HR THEN CLS
2040 IF USR HR THEN CLS
2040 IF USR HR THEN PRINT AT VAL
"80', VAL "20", "* HIGH-RES f"; A
T VAL "90", VAL "22"; US; AT VAL "1
2050 FOR A=N1 TO VAL "12" STEP V
AL "3"
                   IF USR HR THEN LPRINT R; 115
   2050
   2000 IF USR MR THEN LPRINT R;115
+A,80-A,186+A,70-A
2070 NEXT R
2080 IF USR MR THEN PPINT ;;;AT
16,30;"BM",TAB 30."BM",TAB 30.
"ATM",AT 41,30,"BB",TAB 28."BM
  2090 IF USR HR THEN PRINT , AT V
AL "5", VAL "46"; "HI", TAB VAL "44
"; "THERE.", TAB VAL "42"; "IM YOUR
"; TAB VAL "42"; "DEALER, "; TAB VAL
"42"; """VEGAS"; TAB VAL "46"; "80
B"""
   2100 IF USR HR THEN LPRINT C,195,161,30;D,165,170,140,158,D,169,175,XD;168,169
2110 IF USR HR THEN PRINT AT URL "130",UAL "14"; "UHAT IS YOUR NAME?"
   2120 INPUT N$
2130 IF USR HR THEN PRINT AT 130
,N0," OK,";N$,".";E$,E$,E$,RT 13
6,N0;"LETS SEE YOUR BANKROLL. $"
    2140 INPUT 0
2150 LET O=ABS INT 0
2150 IF USA HR THEN PRINT 0,AT U
AL "150",ND,"PLAY WITH HOW MANY
DECKS?"
    2180 INPUT ND
2190 GOSUB VAL "708"
2200 IF USR HR THEN CLS
2205 GOSUB 500
2210 IF N-J<14 THEN GOSUB VAL "8
     2215 IF USR HR THEN PRINT "4";0;
     * 86T="
2220 INPUT P
2230 LET P=85 P
2240 IF P(=0 AND P(=2000 THEM GO
TD 2300
2250 GOSUB 500
2260 IF P(2000 THEM IP USR HR TH
     2250 G0508 500
2260 IF P:2000 THEN IF USR HR TH
EN PRINT "LIMIT=$2000, "
2270 IF USR HR THEN PRINT "BET T
00 HIGH"
2280 G05UB VAL "410"
2290 G0TO VAL "2205"
```

```
2330 LET
2340 LET
                                                       D=E
   2340 LET T=E
2340 LET T=E
2350 FOR X=E TO 4
2360 GOSUB 200
2370 LET T=NOT T
2380 NEXT X
2390 IF D(4) 4D(6)
                                              D(4) +D(6) =11 THEN GOTO 2
   900
2395 GOTO 2440
2400 IF USR HR THEN PRINT HT 64,
55;"STAY"
2410 IF NOT E THEN GOTO 2580
2420 LET TENO
2430 GOSUB 200
2440 IF D(5):15 THEN GOTO 2500
2450 IF D(3):N0 THEN GOTO 2470
2450 GOTO 2580
2470 IF D(5):11 OR D(5):8 THEN G
    2470 IF D(5);11 OR D(5);8 THEN OTO 2580
2480 LET D(5) = D(5) + 10
2480 LET D(5) = D(5) + 10
2495 GOTO 2440
2500 IF D(5);622 THEN GOTO 2560
2510 IF D(3);N0 THEN GOTO 2530
2520 GOTO 2560
2530 LET D(5) = D(5) - 10
2540 LET D(3) = +D(3)
2550 GOTO 2440
2560 LET E=N0
2560 LET E=N0
2570 IF D(5) = 21 THEN GOTO 2730
2580 LET T=N1
2590 IF NOT D AND NOT E THEN GO
     2590 IF NOT D AND NOT E THEN GOT 0 2730 2600 IF NOT D THEN GOTO 2620 2610 GOTO 2640 2620 LET T=N0 2630 GOTO 2430 2640 IF USR HR THEN PRINT AT 84, 55,;"HIT?" 2650 LET Z$=INKEY$ 2660 IF Z$<-"N" THEN GOTO 2650 2670 LET D=Z$="Y" RND Z$<-"N" THEN GOTO 2650 2670 LET D=Z$="Y" 2680 IF NOT D THEN GOTO 2400 2690 IF USR HR THEN PRINT AT 84, 55,"OK."
                                               NOT D AND NOT E THEN GOT
2500 IF USR HR IDA.,
2500 IF USR HR IDA.,
2700 GOSUB 200
2710 IF D(6) > 21 THEN GOTO 2800
2720 GDTO 2410
2730 IF D(5) = 21 THEN GOTO 3000
2740 IF D(5) = 21 THEN GOTO 2760
2750 GOTO 2760
2750 LET D(6) = 20 (6) + 10 *D(4)
2770 IF D(6) > 11 THEN GOTO 2730
2780 IF D(5) > 21 THEN GOTO 3000
2790 IF D(5) > 21 THEN GOTO 3000
2790 IF D(5) = 20 (6) THEN GOTO 3200
2795 GOTO (D(5) > D(5) *100+3000
2800 LET Z$="--8UST---
2810 GOSUB VAL "400"
2820 GOTO VAL "3100"
                                   GOTO VAL "3100"
LET P=2*P
LET Z$=U$
LET D(6) =D(6)+16
        2820
2900
2910
        2926
         3260 IF 0 NI THEN IF USE THE PRINT "PRESS P TO PLAY"
3270 LET T=N0
3280 FOR A=2 TO D(N1)
3290 LET D(N1)=N0
3300 LET M=A(R,N1.
3310 LET I=A(A,2)
3320 IF INKEY$="P" THEN GOTO 340
            2330 GOSUB 10
3340 MEXT A
3400 IF 0(N1 THEN GOTO 3450
3410 IF INKEY$(>"P" THEN GOTO 34
```

```
2300 IF USR MR THEN PRINT "$" P; 3420 GOTO 2200 AT 130,56," CUM"; TAB 56, "AGE"; 3450 GOSUB VAL "500" (; AT 24,58; "BE", TAB 58; "BE", TAB 58;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 8 IF INKEY$ (>"G" THEN GOTO UA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            3480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                E"
9013 IF USR MR THEN LPRINT U,"B"
9014 IN INTERPOLATION IN INTERPOLATION IN INTERPOLATION IN INTERPOLATION IN INTERPOLA
```

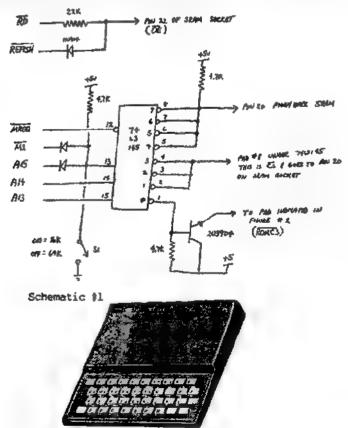
9130 IF PEEK VAL "32600" AND THEN IF USR HR THEN SALE "DATA", 3 9140 IF PEEK VAL "32600" (>N1 THE N IF USR HR THEN LORD "DATA", 5 9150 GOTO VAL "2000" 9150 GOTO VAL "2 9900 REM #= 32 9900 CLEAR 9905 LET HR=VAL 9907 LET NO=NOT 9910 LET T=VAL " 9915 LET T=VAL " 9920 DIM C\$(4,13 9925 LET E\$#" "19400" NO=NOT PI N0=NOT PI N1=NOT N0 T=VAL "8192" C\$(4,13,8,5) E\$=: X=N1 TO 4 C=N1 TO 13 L=N1 TO 8 A=N1 TO 5 C\$(X,C,L,A) =CHR\$ PEEK T=T+N1 9925 9936 9935 FOR 9949 9945 FOR 9950 LET LET 9960 NEXT Ä NEXT NEXT NEXT NEXT LET !!! 9965 DELETE AFTER RUNNING 9970 9975 9980 6000 约章="是是是是是是是

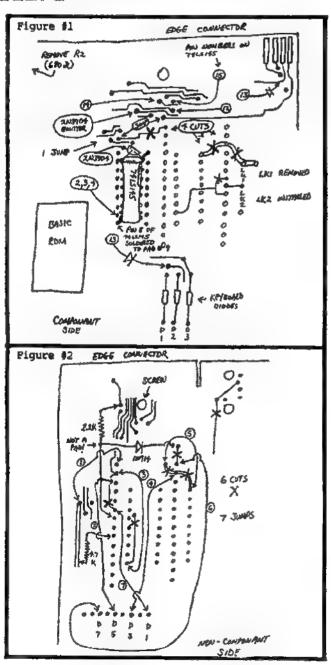
## INTERNAL 64K RAM for the TS/ZX

by Tim Stoddard

I presented, near the end of 1986, two articles on upgrading the TS2010 ram pack to 64K. Shortly before that I had also designed a three chip INTERNAL 64K upgrade. But the chips used (NEC's 43250 SRAE) cost 355 EACHI This, I thought was such too such to pay for that amount of memory, hence, the article for the TS2016 upgrade. I have been following the price of the 43250 chip, and it is currently priced at 314.95, with every indication of going down further. So this is, perhaps, as opportune time for this article.

Schematic #1 shows the selection logic used. I used the 7415145 which is an open-collector sutput and eliminates using diodes to tis together the appropriate 8% blocks for each of the two 43256 SRAMs. The 2.2% resistor and 19914 diods at the top-left side of the schematic makes this upgrade compatable with VEYMIL's high resolution program THRUST. THRUST and this upgrade works BEAUTIFULLY: The upgrade must be in the 16% mode to run THRUST, however. The 283004 transistor deselects the BASIC ROM unless the current address is in the first 8% block.





#### WARM MP THE SOLDERING IROUS!

First, using the proper anti-static procedures, take off the back of the TS/ZI case and remove the PCB from the case. The modification can be done with the keyboard connected but I don't recommend doing it that way, With the PCB out and on the asti-static mat, remove the old SRAMs and sockets if there are any. If you are modifing a 1% 2X81, remove jumper LE1, and install LE2.

Next, perform the four cuts shown in FIGURE 1, then install a 28 pin socket where the 2K ram would go. Using FIGURE 3, prepare the 74LS145 as shown and install it where the LEFT 1K SRAW would normally go. You'll need to slightly spread pin 16 up to ped 18 and solder, then epread pin 8 down to pad 9 and solder. This brings in the 5 volts for the 74LS145 chip.

Connect up the remaining wires, diodes, and transistor as shown in FIGURES 1 & 3 then reconnect the keyboard cables (carefully) if you have disconnected them. Turn the PCB over and perform the six cuts & 7 adds as shown in FIGURE 2. MOTE: Adds numbered 1 & 5 should be slightly larger wires than the standard 30 guage wire-wrap type wire, as these pass 5 volta on to other logic. How add the two resistors and one diode as shown in PIGUEB 2.

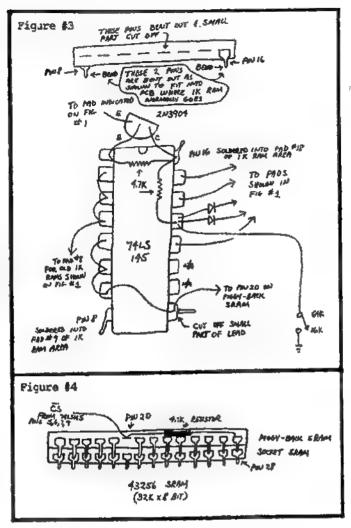
Plug in ONE 43256 SRAN into the 28 pin mocket, somew the PCB into the top half of the case and power up. Too should get the "E" cursor in a few seconds. Execute PRIST PEEK 16388 + 256 % PEEK 16389. This should give you 32768. If this works, power off, remove the 43256 SRAR and parform the "piggy-back" modification shown in FIGURS 4. Install the "piggy-back" SRARs into the 28 pin socket and connect up the top SRARs' CS wire to the 74LS145 as shown in FIGURS 3. Fower up and execute one at a time;

- 1) POKE 16385, 255
- 21PDKR 16389, 255
- 3) FRV
- 4) PRINT PERE 16388 4 256 \* PERE 16389

This should give you 65535...... IFTERMALLY: Make sure that switch S1 is off (open). You can mount Si anywhere you have room for in the case.

The SRAMs are available from MICROPROCESSORS UNLIMITED for \$14.95 each plus 36 second day Federal Express delivery. They don't have a minimum order restriction and can be reached at (916)267-4901. I would expect the price to drop another two to four dollars by the time this article is in

Tim Stoddard 85-48 66th Road Rego Park, #7 11374 CompuServe 73127,2564





#### NUMBERS STUDY

by Syd Wyncoop

Why would we want to study numbers? Because, our computers only understand numbers. You may saying, "My computer knows Basio" or may of several other lenguages but, the truth of the matter is that it does not know or understand any language other than the assembly language of the Central Processing Unit (CFU). All languages and hence, all programs are stored in the computer memory as numbers. Nook, for a moment, at your Sinchair character tables. The Basic sommand PRINT is result the number 245. Since all programs are numbers, it behooves us to know a little bit about them. I don't know about you but, I hate machines that are smarter than I mai all languages used by any computer, except assembly, are referred to as 'high level' languages. High level languages come in two varieties, compiled and interpreted, Compiled languages are converted (compiled) into the CFU's assembly language and run as machine code and therefore run quicker than interpreted languages. Interpreted languages are interpreted into assembly

language at the time of execution. They still run as anchine code but, much slower due to the interpreter processing time which uses a library of routines, which are slower by their very

which uses a literary of research programming to use our neture.

We do not need to learn assembly programming to use our computers however, understanding the numbers and why different bases are used will help us be more efficient programmers in the language of our choice. Of course, many of you may have desired to know more about machine code and been straid to tackle it. After all, those long Hex (whetever that is) dumps in the magazines seldom make sense. Or maybe you have seen those Hexidecimal numbers and wondered why anyone would resort to such sutterings! If this discribes you, then perhaps the following study can be of help.

study can be of help.

We are going to attempt to thoroughly understand three number systems or beses as they are properly called. There is a fourth base, Octal, which I will not discuss here as you will soldow encounter it. Octal will be found in the programming

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guides published by thip manufactures and can be useful however, we can do quite well without it for this study. Each base will be discussed separately however, I will make references back to Decimal, as that is the case we all use dailey.

#### Decimal (Same 19)

The first is Decimel (dee), or base 10 numbers. We are all familiar with decimel as we use it every day to count our bags of money and for various other tasks. Host of us learned in school that the columns of digits represent ones, tens, hundreds, etc. For example:

h b 0 4 6 6 .... n o a n 4 d n e 5 9 9 4

What you may not recall is, each column represents 15 (the base) raised to the power of the number of the column as counted from right to left, starting at zero. Howe that for doubletalk? Follow through this example, to see that 1234 decimal

> 10°0 : 1\*4 : 10°1 = 10°3 e 10°2 = 100\*2 ± 290 1234

Study this carefully as it is the easiest axample we will have and it must be understood or the rest will really seem like Greek to you.

Before continuing, it bears sentioning that all bases are represented by the digits 8 to Base-1. Base 16 is therefore represented by the digits 8 to 9. It is these digits which them represent a mutiple of a power of the base, as above (16°8\*4). No digit can be greater than Base-1 because at the point it equals the Base there is a carry to the next column. For instance, in base 19, 9\*1\*58 and carry 1 to next column. All of this should be familiar to you but if you are like me, you

haven't given it much thought since school. No, I wont say how long ago that was:

#### Binary (Base 2)

Now for the hard stuff, Binary (bin), or base 2. Following our discussion of the last paragraph, we can only represent binary numbers with the digits 6 and 1 (remember base-1). This means our columns also must have meanings other than ones, tens, etc. They now become ones, twos, fours, eights, sixteens, etc., which are the powers of 2 (our base) instead of powers of 16. For example:

1 2 Foto huwa troa 1 # 1 1

As in our previous example, 1611 really means:

270 = 1\*1 = 1 2°1 = 2\*1 = 2 2°2 = 4\*8 = 8 2°3 = 8\*1 = 8 11 decimal Totals

How you know why we count in decimel! You thought it was because we have ten fingers. Reagine having hands with two fingers on each hand. Binary would then seem as easy se decimal. If you have any difficulty with this, go back to the discussion on decimal and compare it with this one. Only the base is

different.
What you have just learned is how to convert binary to decimal. The procedure for converting decimal to binary is similar. Briefly, divide your number by the largest power of two not larger than your number You continue this process with successively smaller powers of two until you have reached 2°0, at which time there should not be a remainder. Write down (left to right) a i when the division is possible and a 8 when not possible. Using our example of 11:

Step

1. 2\*4=18 and 2\*3=8 therefore,
2\*3 or 8 is the number we want.
2. 2\*3=8 and 11/8=1 remainder 3
2. 2\*4= and 3/4=8 remainder 3

1 16

Rosult

2°1=2 and 3/2=1 remainder 1 101 2°5=1 and 1/1=1 remainder 9 1011 We have now converted 11 decimal to 1011 binary

Some of you may be wondering what the point of all this is.

After all I barely passed math is school, why bother with this
now? The point is, while decimal is more comportable for us
humans, binary better represents how our computer "thinks".

An explanation of the CFU is in order. This is background
only to give you nome understanding why the "mant' computer
doesn't understand decimal. The CFU (which is the ISS in our
Sinclairs) is merely a collection of transisters and transisters
are simply electronic switches. For those of you who know
better, please bear with me, my and will justify the extress
over simplification. We all know that a switch can either be on
or off. Binary allows us to represent the ca/off states with one
and sere, respectively. Not quite perfect but it works.

Most binary numbers you will see, will have eight digits or
number with leading seros. For instance, ISH binary would
normally be written as 60001811b. The reason for eight Binary
digits (bits) is that eight bits make one byte.

A byte is not what your neighbors doe puts on you. A byte
is the 'wordsize' of your CFU. A word is the number of bits
handled as a complete unit by the CFU and is commonly referred
to as a byte. The ISO is an eight bit CFU, therefore one
byte-clight bits. Words and bytes are not exactly the same, but
will suffice here. You do not need to understand binary numbers.

Binary is most useful for graphics in Basic or make in
assembly. Unless you decide to learn assembly, you will seldom
work directly in binary due to the difficulty keeping the digits
gorrect, which leads us to the difficulty keeping the digits
ever directly in binary due to the difficulty keeping the digits
gorrect, which leads us to the next base...

#### Bexadecimal (Base 18)

Now that we have sastered binary we can dig into the last of the three number systems. Bexidecimal (hox) or base 16 is used because it works very well as a shorthand for that swful binary. I have provided several charts for easy conversion from hex to decimal and hax to binary or vice versa. So don't leave now, things are about to make sense.

One challengs we have with hex is that there are not enough digits for S to base-1. We have only S to S which will work fine for the first ten digits. We need to improvise for the last elk digits and someone far wiser than me (us?) has already solved our dileans. The digits needed to represent 18 to 15 are \$ to \$.

The sixteen hex digits are mon S, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E & F.

Row that we have the digits, we need to recognise the form taken by hex numbers. Just as binary are usually eight digits long, hex numbers are always two (or some multiple of two) digits long. This makes counting in hex as follows:

A close look at the hex to decimal conversion chara will

A close look at the hex to decimal conversion chark will make this much clearer.
You may occasionally see hex numbers that have an odd number of digits. The first digit will be a zero and the second a letter, such as OFFA. I do not use a leading zero however, be aware some assomblers require it, therefore you may see it. There is no need to go into the math needed to convert between hex and decimal as the chart provided will serve the purpose much better, easier and faster. Those of you interested in working out the details need only follow the examples for decimal and binary. Keep in mind the bars is now 16 therefore, the columns of digits will represent ones, mixteens, two bundreddiffyrenixes, etc.

therefore, the columns of digits will represent ones, sixteens, two bundreddifty-sixes, etc.

All this brings us to what I mean by hex being a shorthand for binary and the reason we are even interested in hex. A close look at the hex to binary conversion chart will make this more obvious. You can readily see that four bits can be represented by one hex digit. For those of you who understood my ramblings about bytes, four bits is a small byte (also known in some circles as a nyble). Could I make this up? Therefore, we can represent any eight bit byte with only two hex digits.

You may recognize that this is not that much better than decimal however, decimal cannot be converted to binary with the same came as hex. Also, numbers larger than 255 will really create some headsobes that hex helps solve (more on this is a minuto).

minute).

We now know how to write numbers in three bases, decimal, binary, and her. In order to avoid confusion we need to make a proper designation of each. You should always nuffix all binary numbers with a 'b' (198801886) and all her numbers with a 'b' (25h). Occasionally, you may see a 'd' suffix on decimal numbers however, it is not needed as decimal is the default. We

numbers nowever, it is not needed as decimal is the default. We will do this even though some numbers can obviously only be her (FFh). You must always be careful to follow this notation or you will create unnecessary confusion for all.

You should take some time to practice using all the charts. Also, practice simple arithmetic in each base (add, sub, mult & div). You can use the charts to check your answers. Before long you will be thinking in hex and binary as easily as you now do in decimal.

in decimal.

Ok, let's look at how numbers larger than 255 are stored and handled by the CPU.

That's twice I mentioned 255 without an explanation. The reason 255 are mugio number is because it is base-1 for base 256 numbers. I am not going to boggle your mind with this number system as it is not needed by us, only the CPU uses it. May in the world does the silly CPU use base 2567 Let's go back to our discusion of binary, bytes and related whatevers. Resember, we padded out our binary numbers to eight distic as one byte for the 156 is eight bits? The reason the CPU uses base 258 is 275 x 256. Voilal On your own, figure out what litility means in decimal.

We can actually store numbers between # and 66555 by tising two bytes together. This is done by the CPU automatically to generate addresses. The second byte is increased by a factor of 256 as this is the number that generates a carry out of the first byte. For example:

> 11111111 1000000000

Remember, 1+1 binary # 8 and carry 1 just as 8+1 does in decimal. Work out the above problem yourself to see how the result is achieved. You will notice we now have a number which is nine digits long. In truth, the actual number is 00000001000000000 because we are tising two bytes together and each byte is padded out to eight digits. Since our number is now sixteen bits long, the largest number we can store is 2\*18-1 or sasse.

You can now see why we need a shorthand for binary. Today, we rerely work with large binary numbers as it is too easy to err. We will not discuss binary numbers larger than eight digits either. If you decide to learn an assembly language, you will probably only use binary when working with the losic instructions. You say find it interesting that early programmers had to use only binary numbers sad they were entered from a panel of switches instead of a keyboard. Today, using machine code is duck soup and bax is much easier to work with.

What did I mean, 'tie two bytes together and increase one of them by a factor of 2569' Let's assume our number is stored in byte 1 and byte 2. The formula to recover our number is. You can now see why we need a shorthand for binary.

#### Penk byte 1 + Feek byte 2 \* 256

Looks a little familiar? You probably have seen something similiar before and did not know what was happening. The byte we increase by the factor of 256 is called the high byte which makes the other byte the low byte. Using high/low nomeclature our formula becomes:

#### Peak low byte + Peak high byte # 256

One pecularity designed into the CPU is that contrary to the number systems we have discussed, the CPU stores the low byte first. This must be kept in mind or you will not at all get the results you were trying to achieve. Scan the list of system variables in your fincinir manual and use this formula on some of the 2 byte variables. The results are the address at which that area of memory begins.

Seview some of the areas of your Simulair manual that did not make sense before. Especially the chapters on number systems, machine code, system variables, memory, and the appendices. There is a wealth of information there however, it is presented so poorly that it may not have made sense before. Then compare notes with this study and you will be well on the way to understanding machine code.

#### Bax/Bin Conversions

Hex	.1	Bin	Hex	1	B15
8	1		8	1	1900
ii.	1	2231	9		1061
	1	0019	A	\$	1016
3	1	9911	16	1	1011
ii.	1	Ø106	C	1	1100
5		9101	D	- 1	1101
ē	- 1	0110		- 1	1110
Ž	- 1	9111	T T	1	1111

To use: any four bits can be represented by a single hex digit. For example, 101001000 m A4h.

#### Heat/Dec Conversions

3		1	1 2	1 # 3	4 (	6 1	6	7.5	# !	9 1	A 1	*	C!	D	E 1	F 1
														13		
														45 1		
														61		
														100:		
														1411		
														1 189		
0 1	264	H 20	<b>0</b> 1 81	0: 21	11 ZL	2 21	21 31	41 21	bi 24	1 21	C) 68	-1	-1	-1		
1-4-		+								- 1	h # v . v	- F a a		-1		

To user find year decisal number, follow to laft edge for first haw digit and up for accord her digit for example, 237 = 530.

#### NUMBER BASE CONVERTER

#### by Syd Wyncoop This program runs on

the TE2068 or the 2xml

This is a useful BASIC routine to do conversions between number bases. It will run on both the ZX81 and TS2068. I have included in the listing the necessary changes for the ZX81 (or TS1000/TS1500).. The only other requirement to run on the ZX81 would be to break the multi-statement lines into all single statement lines.

1 BORDER Ø: PAPER Ø: INK 4: C 1.9 2 ON ERR GO TO 866 3 GO TO 1000 100 REM Decimal to Hex Entry:a=decimal number Exit : a=decimal number h\$=hex number 110 LET h\$="": LET hh=INT (a/25 6): LET hl=a-hh\*256 120 IF hh<1 THEN LET hs="06": GO TO 140 13Ø LET n=hh: GO SUB 15Ø 140 LET n=hl 150 LET n1=INT (n/16): LET n2=n 160 LET hs=hs+(CHRs (n1+48+(7 A ND n1>9)))+(CHR\$ (n2+48+(7 AND n2>9))) 170 RETURN 180 REM TS1000 users replace line 160 with: LET hs=hs+CHRs ( n1+28)+CHR\$ (n2+28) 200 REM Hex to Decimal Entry: as=hex number Exit :as=hex number a=decimal number 210 LET hs=as: LET a=0

220 IF LEN h3<3 THEN GO TO 250 236 GO SOR 256 240 LET a=a\*256: LET hs=hs(3 TO 25Ø LET a=a+(CODE h\$-48-(7 AND ha>"8"))\*16+(CODE h\$(2)-48-(7 A ND h\$(2)>"9")) 26Ø RETURN 28Ø REM TS1000 users replace line 250 with: LET a=a+(CODE ha -28)\*16+(CODE h\$(2)-28) 300 REM Decimal to Binary Entry a=decimal number Exit :a=decimal number 510 LET bs="00000000": LET n=a: IF n>255 THEN LET n=INT (n/25 6): LET n1=a-n\*256. GO SUB 360: LET n=n1: GO SUB 360: LET b==a\$ +bs: RETURN 380 FOR 1=7 TO 0 STEP -1 370 IF n>=2'1 THEN LET b\$(8-1) ="1": LET n=n-2'1 380 NEXT 1: RETURN 400 REM Binary to Decimal Entry: a\$=binary number Exit :as=binary number a=decimal number 410 LET bs=as: LET a=0: LET n=L EN bs-1 420 FOR i=n TO 0 STEP -1 430 IF bs(1)="1" THEN LET asa+ 2^1 440 LET bs=bs(2 TO ): NEXT 1 45Ø RETURN 500 REM Set Decimal Tabs

628 LET T=T-(1 AND A>10008)-(1 AND A>1000)-(1 AND A>100)-(1 AN D A>18) 53Ø RETURN 800 REM Error Trap 810 PRINT #0; Invalid Entry--Pl ease Try Again": PAUSE 150 820 GO TO 1030 1000 REM Main Loop 1010 PRINT ' TAB 8: "NUMBER CONVE RTER" 1929 PRINT "Be sure to append a 'B' or 'B' "to all binary and hexidecimal" "entries, respectively." "There is no suffix req uired for decimal numbers, as t hey are thedefault." 1030 POKE 23658.8: INPUT AT 0.0: "Type number and press ENTER"'
LINE as: LET n=LEN as 1040 IF a\$(n)="D" THEN \$( TO n-1): GO TO 1070 1050 IF a\$(n)="H" THEN LET as=a \$( TO n-1): GO SUB 200: GO TO 1 1060 IF a\$(n)="B" THEN LET a\$=a \$( TO m-1): GO SUB 400: GO TO 1 asa 1070 LET A=VAL AS 1080 GO SOB 100: GO SUB 300: GO SUB 500 1090 PRINT AT 16.0:" Dec Bin" 1100 PRINT AT 18, T; a; TAB 6; h\$; "h ;TAB 15;b\$; "b" 1110 GO TO 1030 9990 MOVE "NumConv.bas",1

## Beginning Z80 Machine Code

#### LESSON EIGHT

By Syd Wyncoop

Last time we covered a let of ground by skimming quickly over it. If you did not understand all the rotate in shift instructions, don't worry. You can get along fine without them for new. You should however sake sure you hover over the logical instructions, And, Or and Kor, long enough, as they are very marked.

You will also need to review my article on number systems, as a thorough explanation of Binary is given there. For this reason. I did not give much explanation of Binary in the last

Now, lets discuss some instructions that are off in the corner by themselves. The first is Nop, which is read No OFEration. You guessed it, it doesn't do mything. Almost. The purpose of Nop is to waste time (4 T states) and provide a space filler. No flags are affected.

Nop is also used by us programmers to fix our errors.

Nop is also used by us programmers to fix our errors. You can replace unwanted instructions with a Nop, by direct pokeing, rather than re-assemble a large section of code.

Cpl seams Complement the accumulator. We have briefly mentioned complementing a few times. The result is to invertall bits. For example, assume the scoumulator contains 1911011b. After complementing, the accumulator will contain 510001000.

Neg will NEGate (2's complement) the accumulator will pield 51000101b. Creating the two's complement of a number is done by complementing the number and adding one. Meg performs this operation on the contents of the accumulator. Any number plus its two's complement will equal zero.

The lest instruction is Das which seems Decimal Adjust Accumulator. This instruction works in conjuction with the R1d and Rrd instructions from last lesson. As I stated then, I have not found a good use for these instructions. I will however give a brief description of their purpose, as you may encounter them.

Dan adjusts the accumulator for Binary Coded Decimal (BCD) addition and subtraction operations. In order to understand Dea and its rotates, we need to understand BCD. BCD is a method of representing a decimal digit (8-9) in four bits, such the same as any single hex digit (8-7) can be. This means that 15BCD is 800010180b in binary digits and not the usual 80001112b that we would normally find in binary representations. Look again, this is because there can be no digit greater tham 2 in any four bits, in BCD. The problem is that our old friend, CPU, does not know whather we want to store decimal or hex digits in its words. Therefore, Das will check the half-carry flag to determine when to adjust the binary result, back to a decimal digit. The only advantage to BCD, that I have found, is that it makes the retrieval of decimal digits easier.

As I have said. I do not subscribe to the pathography that

As I have said, I do not subscribe to the philosophy that BCD is a necessary or useful tool. Therefore, I will deell on it no longer. You can find texts on the subject, if you are interested.

interested. That's all the instructions for this lesson (Tim says I have been getting long-winded). I did however leave some of you hanging last lesson with the question, "What is source code?" This question was raised by some readers requesting information and instruction on the use of assemblors.

I must make very general comments as each assembler has its own set of commands. Unfortunately, the best way to learn the commands is to use the assembler. The basic operation of assemblers is simple. They allow us humans to type in our HC as memonics instead of hex digits. The assembler then uses our ancesonics to assemble the binary instructions that are understood by the CPU.

There are humically two types of assembles. The first is

by the CPU.
There are basically two types of assemblers. The first is an interactive or virtual assembler, a good example is Hot-2 by Ray Kingsley. This type of assembler is a little more difficult to use but such quicker. It generates the HG in place as you type in the measurement. The disadvantage is that it is not as easy to move and re-address large sections of code. The ascond type will generate an ASCII source code file in addition to the assembled HC. Source code is much like a letter you might type on your werd processor. It is an ASCII ancoded file containing all the labels and memonics you type into it, as well as pseudo-ops. The disadvantage is a loss of speed and disc space, as above ere two files to handle. Hach of this is offset by the gain in flexibility to change the code as well as the ability to comment the source code file. The addition of comments are a huge benefit in helping yourself remember what it was you had intended the code to do. The best example is Zaus by Grystel Composing.

I use Hot-Z and Zaus regularly and feel they are the best available for the 2868. Hot-Z is the only assemblar available for the 18009. I have several for the TS1000 that put the memonics in RRM statements, but none of they work very well.

A moment ago I mentioned pseudo-ops. These will vary as to availability with your assemblar and will be detailed in the instruction manual. Pseudo-ops are assembler directives, not memonics. They tell the assembler important things at the time of assembly. They do not generate any MC instructions and are not securable by the 280.

Typical pseudo-ops are:

Typical psaudo-ops ara:

Org.....assemble the following MC from this address to End or the next Org

Equ. ...not label equal to specified value

End. ...end of source file

Defb ...defines the contents of the current byte

Defw...defines the contents of the current word

Defs....defines an amount of bytes to be reserved

the current address Defm.....defines the contents of the current bytes

#### mm stated ASCII string

There are many more proude-ops, but these are the most common. You will also encounter labels and comments in source listings. Labels are much like Basic variables. They assign a name to an address. Some assemblers require labels to be followed by a colon.

Comments are just that and are preceded by a seni-colon. They may appear at the end of a line, to explain that instruction, or on a line by themselves.

Now, our utility for this lesson. These of you using the TS1800 will particularly appreciate this one. It will generate a lise & Rea statement of the size specified. You need only type two commands to run the onde:

Rand length

Rand length

Let x=Uar address

The first will load the length of the desired Rem statement into the system variable, Seed. He formatting or conversions required by Fou. The second statement will run the routine from the loaded address.

Hatch the source carefully, ms it will run on both the the S12023 and TS2068, but there are some lines that are unique to each computer. Also, it must be loaded and run from above remove or you will confuse the poor CFO.

#### ; Cenerate Rom Statement

;get length desired ;adjust for Rom ;adjust for EOL Garden Ld RL. (Seed) Ino EL Ino Hu Push HL save line length Ld BC.4 Add RL.BC Push RL get length into BC as required iget length into BC as required by Roa routine [151000] only-address to put Rem [151000] only-attement at [151000] only-Rom routine to make [152005] only-Rom routine to make [152005] only-Rom routine to make [152005] only-Rom routine raturns with DE-last byte [151000] only-RoL marker [151000] only-RoL marker [152000] only-RoL marker [15000] only-RoL marker [15000] only-RoL marker [15000] only [1000] marker [15000] only [1500] marker [15000] only [1500] marker [15000] only [1500] marker [1500] only [1500] onl Pop BC td HL, 407Dh Ld HL, (Prog) Call 099Eh Call 1288h Ld A.76b Ld A, ODh Xor A Ino Hu gorrect the pointer load high byte of line number adjust pointer Ld (HL) A Ino St load low byte of line number retrieve line length adjust pointer Ld (HL),A Pop BC load low byte of line length Ld (BL),C Inc HL Ld (HL),B adjust pointer; load high byte of line length; adjust pointer; load Rem character; the line is now complete, but it; contains "garbage" that should be Inc Hi (HL), EAh cleared out Ld EC. (Seed) Xoz A iget length of space made ,A=0, you could use Ld A.x. where ,x=any fill character Loop adjust pointer clear the byte Too RL Ld (HL) A adjust counter Dec BC Ld A.B Or C Jr HE, Loop ;loop to clear next byte if BC<>8

Early in this series, I promised to show you am many way to neve and load your MC above rantop on the T81200. Since we now have a routine that must run there, this seems like a good time to keep my promise.

return to Basic

Habe the following changes to the hex loader from lesson

60 Let Ag: "210C40C98" 70 Rem insert your own HC string of hex digits between the quotes in line 60 and end the string with an 's'

The secret to remember is that AS contains all the MC as a string of hex digits. You must also remember to reset ramtop and type a New command, before re-loading your saved MC Basic. Next lesson we will learn the block instructions. You will be assaued at the difference in speed:

And now, a special little willity for the TS1000. The TS2065 has several nice graphics commands. This routine will enulate the Flesh command on the TS1000 by fleshing the entire acreen. I will leave the modification of it to you, for fleshing one or more characters.

: Thack Soroun

:get start of D-File :line count :step over EOL marker Flash Ld SL. (D-File) Ld C.16h Outrip Inc HL Ld B, 20h character count Innels invert it invert it ireplace cherecter ; advance cherecter pointer ; wheck if him complete and loop Add A.66h Ino HL Djas, Inario if not Dec C count line done check if screen complete and Jr MZ, Outsip return to Basic Ret Done

This routine can be called from your Basic programs with a Band Uar eddress command. The following will demonstrate:

16 Rand Usr Flash 28 Pause 56 36 Goto 19

I hope you find these routines useful. We have two more lessons to go and we will be done with the 285 instruction set. You should now be able to write your own MC routines. I believe the only way you can learn MC is to use it, so get stumbling!

#### QLQLQLQLQLQLQLQLQLQLQLQLQLQLQL

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#### "THREAD SPOOLING" WITH THE CUMANA QL DISK DRIVE INTERFACE

by Joe Newmen

call it the "bargain" interface, or the "economy" interface. I prefer not to refer to it as this, because of the negative conotations of the words "bargain" or "economy". Sure the Cumana is the cheapest disk drive interface (along with the CST) for the QL, but it is more than just a disk interface.

Before I got my first Cumana interface, I didn't realize the power potential for this little black device. Only when I started looking through the nicely printed manual at the EXTRA COMMANDS that the interface adds to SuperBASIC, did I start to realize the Cumana's potential. I started to examine this potential, and

discovered a few very interesting things.

In this article, we'll examine a useful and easy to use feature of the Cumana know as "Print Spooling". Print Spooling allows you to send a file to a "spool", which will them send all files on the spool to the printer. The printing is a background job on the QL...in other words, files print out while you still have complete control of SuperBASIC. This can save much time, especially if you have some long files to print out. You can send a file to the spool, and the file will be printing out while you are typing in some program lines! You are no longer limited to the buffer of your printer!

The example program I have made is for printing out more than one QUILL (QL Wordprocessor) file. Imagine that you have five or six letters to type, but don't wish to wait for each letter to print out while you type the next one. To use my program, you just PRINT your letters to disk, then use my program to print out all

the letters at once, at your convenience.

In order to print a file to disk, first type your article, letter, or whatever, then choose the print command in Quill (Hit F3, then P). Now hit ENTER twice only! The prompts that you press ENTER to are: Current, and Whole. Now instead of hitting ENTER for printer, type in a name (such as "letterl"), then hit ENTER. You file will now be stored on disk in the exact format as if it were printed out. In order to be able to use my print spooling program, you MUST print all files you wish to spool to disk in that manner.

Once you have completed your typing and are ready to print your letters, load my program into your OL. RUN it and the following will happen: you will be asked "Number of files to print?". Enter the total number of files you wish to print at that time. You will then be asked "Drive to use (1 or 2)". Enter the number of the drive your disk with the files is in. You can enter a number greater than 2 if you have more than 2 drives. Next you are warned that any file which is spooled CANNOT be removed from the spool until it prints. There is no way to stop the printing of a file unless you reset the QL. So make sure you print the right files. Now you will be asked to enter the name of the file you wish to spool. Just enter the filename itself: the drive name and extension \_LIS will be automatically added (the LIS extension is added by Quill to all files which are printed to disk). Your disk should "whir" and the printer will start printing. If your printer was off, you can still turn it on now and you will not loose any data.

Let's now examine the program in more detail. Notice in Line 50 the FLP EXT? This tells your Cumana interface that you wish to enable the extra commands. If this is not entered first, entering any of the extra commands will just return a bad line error report. Line 70 had the statement: DATA USE DRS. This tells the Cumana which drive will be accessed by the apool command 33

to find your files. DRS will just be equal to FLPI FLP2 (or whatever drive you entered). Line 110 is the spool control...SPL N\$. Yep, that's all there is to it! The MS is just the name of your file (with the LIS tension added). To spool any file, just type SPL and the name of the file. The DATA USE statement specifies which drive to access for the file. After you have entered all your file names, the printer will be printing, and flashing red cursor will be on the screen. Yes, you now use your QL for other purposes, even while it is printing! Try loading a new program while something is being printed...it will work fine. The only real limitation to how much can be spooled or done while spooling is being carried out, is your QL's memory. If you have several large files being printed, you may not be able to load a new program, although you will still have control.

To check on the status of the spooled files, you can enter JOBS and a list of all your spooled files will appear on the screen in the order in which they were spooled. Suppose you send three files to be spooled: filel, file2, and file3. If filel is currently being printed, and you decide you don't want to print file? and/or file3, you can remove them by typing RJOB and the number under the "Job Number" column, a comma, the number under the "Job Tag" column (after entering JOBS), another comma, and a O. This will remove that file from the spool. The following is an example of what is displayed when JOBS is used:

TAG	OWNER	PRIDRITY	•
0	0	32	
2	10	1 SPL	
3	8	1 SPL	
4	7	1 SFL	continued
	0 2 3	0 0 2 10 3 8	2 10 1 SPL 3 8 1 SPL

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. The second files to print? TO USE () OR JY

... 10: FRINT 'L!-.. . . . . CANNOThe remove. MIER FILE NAME.



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## QL ABACUS/SPREADSHEET

PART I

by Mike de Sosa

OL Abacus (OL Spreadsheet or OL-SS in its stateside version) is Psion Ltd.'s excellent spreadsheet program "bundled" with the OL. In the unlikely event you're unsure of just what such a program can do for you, a "spreadsheet" program facilitates the rapid entry of text, data, and formulas into the program and then provides automatically calculated results. Spreadsheet programs are frequently called upon to answer the question "What if?" regarding long and complex calculations: in this case, any one or more input values may be changed and the new result instantly recalculated. Spreadsheet programs are the second most widely used computer program after word processor programs and one big reason for the popularity of personal computers today.

Spreadsheets are not new: the accountant's worksheet, the navigator's log, the builder's list of materials, and calendars and schedules of all types are

forerunners of the concept.

GL Abacus is one of the best spreadsheet programs-certainly one of the easiest
to learn and use-and has few limitations.
Some other spreadsheet programs have more
rows and columns (GL Abacus provides 255
rows and 64 columns-15,320 cells); some
have more directly usable commands and
functions (GL Abacus could do with more
preset statistical functions); and some are
more fully integrated with database and
other programs, but GL Abacus has enough of
everything required for almost any application.

#### BETTING STARTED HITH QL ABACUS

You can plan a spreadsheet on your computer screen, on plain paper, or on some type of graph or tabular paper. When you plan it, give thought to the export formats used to transfer data to the other "bundled" programs, particularly OL Easel (Business Graphics). Get your data and formulas onto the spreadsheet and verify your results without worrying too much about appearance (tabulation, justification, column width, labels, etc.). All of the latter may be taken care of later, if needed. You will usually be looking for a bottom-line result, and you only get points for neatness if the result is to be printed or otherwise displayed.

I won't go into the description of the OL Abacus screen, see the <u>QL User Guide</u>, my naw book available through <u>Time Designs</u>, or run it up on your monitor—it is similar in appearance to other OL software programs.

Enter data or a formula at the cursor location by typing it on the input line and keying ENTER (the program will automatically distinguish between data and formula); enter text by first typing a single or double quotation mark (it is not necessary to end text with a quotation mark). Data entered will appear at the cursor position; formulas will not—only their result. Text will be continued beyond the cell boundary, if necessary.

A stumbling block for many Abscus users is the concept of relative (the norm) and absolute cell references, the cell reference being the grid coordinates of the cell. Abscus assumes a relative reference, that is, if you enter the formula Al\*A2 in cell A3 and then ECHO this formula in cells 83, C3, and D3, the formulas in each cell will be as follows:

CELL A9 B3 C3 D3
FORMULA A1\*A2 B1\*B2 C1\*C2 D1\*D2

Prefix cell references with a 'S' symbol if they are intended to be absolute, For example,

CELL A3 B3 C3 D3 FORMULA \$A1\*\$A2 \$A1\*\$A2 \$A1\*\$A2

Cell references may be mixed, for example.

CELL A3 B3 C3 D3 FORMULA \$A1\*A2 \$A1\*B2 \$A1\*C2 \$A1\*D2

and the 'S' can be used with labels used as cell references, for exemple, SMay.sales.

Another stumbling block for spreadsheet novices is the use of formulas. Formulas are distinguished from data in that they always begin with either a cell reference or an Abacus function: Al+A2 entered in cell A3 is a formula, as is INT(1+A2). Formulas may be difficult to understand and even more difficult to invent; following are some tips:

1) Break down complex formulas into more readily understandable segments and then link these together

2) Use more than one cell to carry out

more complex operations

3) Use labels to designate cell references

4) Learn to use and interpret the "formula" printout version of the Print command sequence.

Some applications require that some or all formulas be stripped from a spreadsheet, leaving the resultant values in place. The easiest way to do this as follows:

- 1) Note the cell reference and unit type (that is, decimal, monetary, etc.) of the cells from which the formulas are to be removed
  - 2) Save the original spreadsheet

3) Begin a new spreadsheet

4) Enter zero (Q) plus the correct unit type in each cell

5) Save the new spreadsheet

- 6) Load the original spreadsheet
- Merge the new spreadsheet with the old.

You now have the original spreadsheet with the desired formulas removed, leaving just raw numbers in those cells.

Another hangup with QL Abscus users is getting printouts of spreadsheets to appear the way they want them to (or, in some 35 cases, getting printouts at all). Format-

ting the <u>screen</u> presentations of spreadsheats does not appear the main problem.

The method of specifying instructions to the printer recommended by the <u>Oi User Guide</u> and other books and articles (i.e., use of the CHR() function in the grid) has significant limitations:

 It may cause displacement of text or data on the printout

2) It cannot be used to specify the

typeface of the upper grid border

3) It is time consuming and bothersome.

the PREAMBLE. There are better ស2្ប\$: POSTAMBLE, and TRANSLATE sections of the QL Abacus printer driver may be modified using INSTALL\_BAS to do this automatically or more I recommend that you produce three printer drivers (PRINTER\_DAT files): one for PICA, ELITE, and CONDENSED typeface pitch; that you include these on your working copy of the QL Abacus program cartridge as PRINTER1\_DAT, PRINTER2\_DAT, and PRINTER3\_DAT and that you select which you will use from the QL Abacus program using the 'Deleta' and 'Backup' options of the Files command sequence. First, "Delete" MDV1\_PRINTER\_-DAT: then, 'Backup' your selection as MDU1\_PRINTER\_DAT using a command such as MOV1\_PRINTER3\_DAT 3.5 "Backup MDV1\_PRINTER\_DAT" from the Files command sequence.

Modify your printer drivers in the

following way:

 Reset the GL, key F1, then place a working copy of GL Abacus in Microdrive 1

2) COPY MOUL PRINTER DAT TO MOUL -PRINTERL DAT (this is PICA, Toopi, pitch)

3) Key in and enter LRUN MDV1\_INSTALL-

\_BAS 4) Select EPSON FX-BO and make a

screen copy of it by keying F1

5) Give the file a new name, 8.g., "print3cond" and modify the PREAMBLE by keying in and entering the the following:

27, 27, 'R,0,27,71,15

(this sets up CONDENSED, 17cpl, pitch)
6) Modify the POSTAMBLE by keying and entering

27,72,18 (resets PICA pitch)

7) Enter the following codes in TRANS-LATE 2 to 5, respectively:

1,27,45,1	(sets underline on)
13,27,45,0	(sets underline off)
·~,27,6S	(sets emphasis on)
"27,70	(sets emphasis off)

(this astablishes symbols which produce the indicated printed result--~ is the tilde)

6) Install PRINTER\_BAT by keying FS 7) Exit INSTALL BAS and return to

SuperBASIC mode

B) COPY MOUL\_PRINTER\_DAT TO MOUL\_-

PRINTERS\_DAT

9) Reset the GL and repeat the procedure from step 3, if you desire to set up a printer driver for ELITE type. (PREAMBLE code 27,,27,'R,0,27,66,2; POSTAMBLE 18)

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Figure 1

Figure 1 is an actual-size printout of a QL Abacus apreadsheet, including grid borders, in condensed, double-struck typeface (17 characters-per-inch). Note that the top line is in expanded typeface and the title underlined. The only way to specify the typeface pitch of the upper grid border is by modifying the PREAMBLE of the printer driver using INSTALL\_BAS.

#### MEH QL QUILL PRODUCTS QL TURBOQUILL

The QL software programs orphans. Psion Ltd. does not intend to upgrade them. But we have seen many upgrade programs that are "patched" with GL Quill or multitasked with it to make it better. KEY-LOCK DEFINE, OSPELL, O\_CALC, But indicators, etc., are some examples. the most important QL Quill accessory program to data is Athene Consultants' QL TURBOQUILL. This subtle "patch" to Oi Quill reduces the "mass" of the cursor-only a white underscore and overscore mark remain--permitting--wonder of wonders--a significant speed-up of many screen operations. Copy and Erase operations, and all other cursor movements, are made much more rapid. GL TURBOQUILL works with mors rapid. KEYDEFINE and TASKMASER, and QL TURBOQUILL+ (with CAPS LOCK indicator and enhancements will soom be available-I'll let you know when). Order QL TurboQuill from Athena Consultants, 33 Holly Grove, Fareham Hants. P016 7UP, England, UK (Tel. [0329] 202083) for #11.20 (about \$19). Specify your version of Quill when ordering.

#### FINAL TIP

Bid you know that you can speed-up OL Quill and other QLsoftware program operation significantly by merely keying F2 and removing the prompt section at the top of the screen? Try it, you'll like it.

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Continued Next Page.

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